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The Journal of Medical Education serves as an international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs, and problems of the Association. The Editorial Board welcomes the submission of manuscripts concerned with the broad field of medical education; this includes preparation for medical education; the medical school experience; intern and resident education; graduate and postgraduate medical education. The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators, and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

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News from the Medical Schools: Material for this section should be transmitted to the News Editor, Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

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Address all correspondence regarding manuscripts, editorials, and letters to the Editor to the Editorial Office, University Hospitals, University of Wisconsin, Madison 6, Wisconsin.

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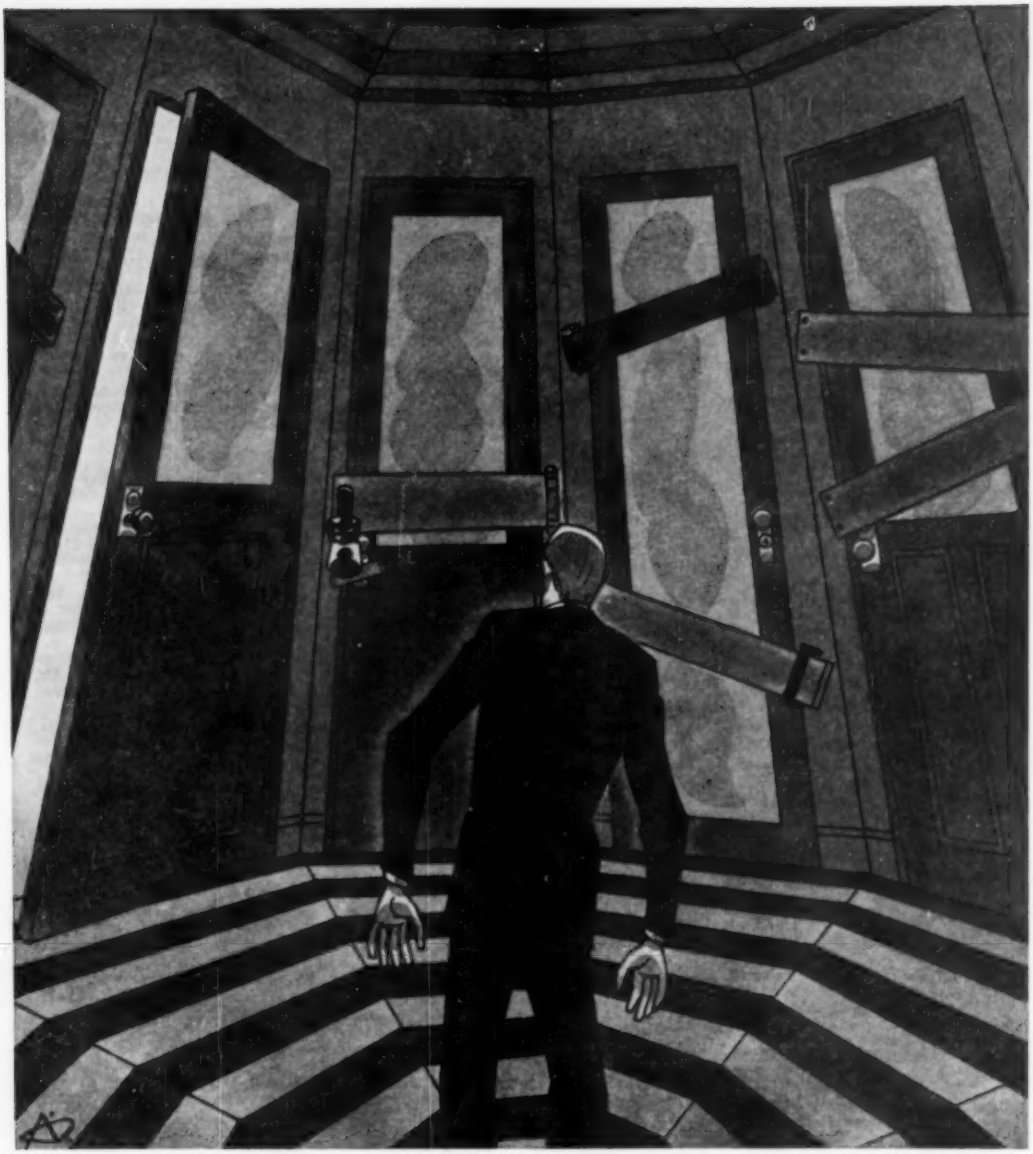

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ASSOCIATION OF AMERICAN MEDICAL COLLEGES

71st Annual Meeting, October 31–Nov. 2, 1960
Diplomat Hotel, Hollywood, Fla.

1960

FEBRUARY

AMERICAN COLLEGE OF ALLERGISTS, INC., Americana Hotel, Bal Harbour, Miami Beach, Fla., Feb. 28–Mar. 5. Mr. Eloi Bauers, 2160 Rand Tower, Minneapolis 2, Executive Vice-President.

AMERICAN COLLEGE OF SURGEONS, Sectional Meeting for Surgeons and Nurses, Statler Hilton, Boston, Feb. 29–Mar. 3. For information write: Dr. H. P. Saunders, 40 E. Erie St., Chicago 11.

AMERICAN ORTHOPSYCHIATRIC ASSOCIATION, INC., Sherman Hotel, Chicago, Feb. 25–27. Marion F. Langer, Ph.D., 1790 Broadway, New York 19, Executive Secretary.

CLINICAL CONGRESS OF ABDOMINAL SURGEONS, Deauville Hotel, Miami Beach, Fla., Feb. 1–5. For information write: Clinical Congress of Abdominal Surgeons, 633 Main St., Melrose 76, Mass.

SYMPOSIUM ON FUNDAMENTAL CANCER RESEARCH (14th), University of Texas, Houston, Feb. 25–27. For information write: University of Texas M. D. Anderson Hospital & Tumor Institute, Houston 25, Texas.

MARCH

AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION, Deauville Hotel, Miami Beach, Fla., Mar. 15–16. Dr. F. Johnson Putney, 1712 Locust St., Philadelphia 3, Secretary.

AMERICAN ACADEMY OF FORENSIC SCIENCES, Drake Hotel, Chicago, Mar. 3–5. Dr. W. J. R. Camp, 1853 W. Polk St., Chicago 12, Secretary-Treasurer.

AMERICAN ACADEMY OF GENERAL PRACTICE, Philadelphia, Mar. 19–24. Mr. Mac F. Cahal, Volker Blvd., at Brookside, Kansas City 12, Mo., Executive Director.

AMERICAN ASSOCIATION FOR THE HISTORY OF MEDICINE, INC., Charleston, S.C., Mar. 24–26. John B. Blake, Ph.D., c/o Smithsonian Institution, Washington 25, D.C., Secretary.

AMERICAN COLLEGE OF SURGEONS, Sectional Meeting, The Broadmoor, Colorado Springs, Colo., Mar. 21–23. For information write: Dr. H. P. Saunders, 40 E. Erie St., Chicago 11.

AMERICAN COLLEGE OF SURGEONS, Sectional Meeting, Sheraton-Portland Hotel, Portland, Ore., Mar. 28–30. For information write: Dr. H. P. Saunders, 40 E. Erie St., Chicago 11.

AMERICAN GASTROENTEROLOGICAL ASSOCIATION, Roosevelt Hotel, New Orleans, Mar. 31–Apr. 2. Dr. Wade Volwiler, Dept. of Med., Univ. of Washington, Seattle, Secretary.

AMERICAN GASTROSCOPIC SOCIETY, Roosevelt Hotel, New Orleans, Mar. 30. Dr. Arthur M. Olsen, Mayo Clinic, Rochester, Minn., Secretary-Treasurer.

AMERICAN LARYNGOLOGICAL ASSOCIATION, Deauville Hotel, Miami Beach, Fla., Mar. 18–19. Dr. Lyman Richards, Massachusetts Institute of Technology, Cambridge 39, Mass., Secretary.

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC., Deauville Hotel, Miami Beach, Fla., Mar. 15–17. Dr. C. Stewart Nash, 708 Medical Arts Bldg., Rochester 7, N.Y., Secretary.

AMERICAN OTOLOGICAL SOCIETY, Deauville Hotel, Miami Beach, Fla., Mar. 13–14. Dr. Lawrence R. Boies, University Hospital, Minneapolis 14, Minn., Executive Secretary-Treasurer.

AMERICAN OTORHINOLOGIC SOCIETY FOR PLASTIC SURGERY, INC., Deauville Hotel, Miami Beach, Fla., Mar. 6–13. Dr. Joseph G. Gilbert, 75 Barberry Lane, Roslyn Heights, N.Y., Secretary.

AMERICAN PSYCHOSOMATIC SOCIETY, Sheraton-Mount Royal Hotel, Montreal, Mar. 26–27. Miss Joan K. Erpf, 265 Nassau Rd., Roosevelt, N.Y., Executive Assistant.

AMERICAN RADIUM SOCIETY, Caribe Hilton Hotel, San Juan, Puerto Rico, Mar. 17–19. Dr. Robert L. Brown, Robert Winship Clinic, Emory University, Atlanta 22, Ga., Secretary.

NATIONAL HEALTH COUNCIL, NATIONAL HEALTH FORUM, Miami, Fla., Mar. 13–18. Mr. Philip E. Ryan, 1790 Broadway, New York 19, Executive Director.

NATIONAL MULTIPLE SCLEROSIS SOCIETY, New York City, Mar. 8. Mr. Donald Vail, 257 Fourth Ave., New York 10, Secretary.

NEUROSURGICAL SOCIETY OF AMERICA, Del Monte Lodge, Calif., Mar. 30–Apr. 2. Dr. Raymond K. Thompson, 803 Cathedral St., Baltimore 1, Secretary.

APRIL

AMERICAN ACADEMY OF NEUROLOGY, Eden Roc Hotel, Miami, Fla., Apr. 25–30. Mrs. J. C. McKinley, 4307 E. 50th St., Minneapolis 17, Executive Secretary.

AMERICAN ASSOCIATION OF ANATOMISTS, Statler-Hilton, New York City, Apr. 11–16. Dr. Louis B. Flexner, Dept. of Anatomy, School of Medicine, Univ. of Pa., Philadelphia 4, Secretary-Treasurer.

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AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS, Netherland Hilton Hotel, Cincinnati, Apr. 2–6. Mr. Donald F. Richardson, 79 W. Monroe St., Chicago 3, Executive Secretary.

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AMERICAN COLLEGE OF SURGEONS, Sectional Meeting, Kahler Hotel, Rochester, Minn., Apr. 14. For information write: Dr. H. P. Saunders, 40 E. Erie St., Chicago 11.

AMERICAN DERMATOLOGICAL ASSOCIATION, INC., Boca Raton Hotel, Boca Raton, Fla., Apr. 8–12. Dr. Wiley M. Sams, 308 Ingraham Bldg., Miami 32, Fla., Secretary.

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AMERICAN SOCIETY OF INTERNAL MEDICINE, Mark Hopkins Hotel, San Francisco, Apr. 1–3. Mr. Robert L. Richards, 350 Post St., San Francisco 8, Executive Director.

AMERICAN SOCIETY FOR PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS, INC., Chicago, April. Dr. Karl H. Beyer, Jr., Merck Sharp and Dohme Research Labs., West Point, Pa., Secretary.

AMERICAN SURGICAL ASSOCIATION, The Greenbrier, White Sulphur Springs, W. Va., Apr. 3–6. Dr. W. A. Altemeier, Cincinnati General Hospital, Cincinnati 29, Secretary.

SOCIETY OF NEUROLOGICAL SURGEONS, Olympic Hotel, Seattle, April 18–19. Dr. Guy L. Odom, Duke University Center, Durham, N.C., Secretary.

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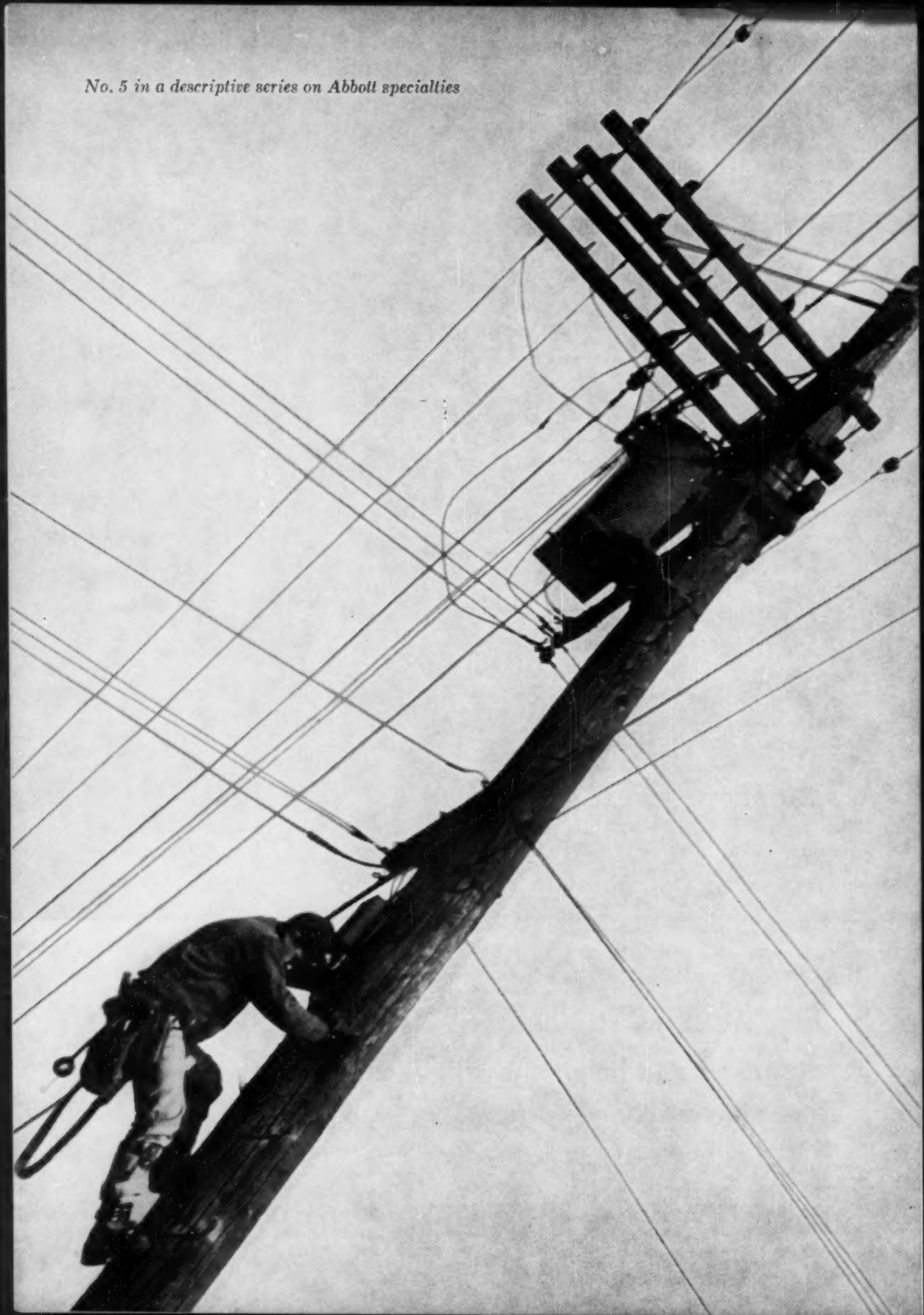

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CONTENTS: Introductory. Antivivisection Movement. Care and Feeding of Animals. Anesthesia. Equipment, Technic, Sutures and Instruments. Surgical Exercises. A. Exercises Suitable for Undergraduate Medical Students. B. Small Animal Operations (Therapeutic). Standard Technical Procedures in the Surgery of the Alimentary Canal. Gastric Fistulae. Intestinal Fistulae: Jejunostomy. Experimental Production of Chronic Peptic Ulcer. Exteriorization of an Intestinal Loop. Surgical Physiology of Intestinal Obstruction. Absorption, Excretion and Motility of the Small Intestine and Colon. Experimental Surgery of the Esophagus. Some Features of Experimental Peritonitis. Experimental Surgery of the Pancreas. Total Biliary Fistula. Experimental Surgery of the Gall-Bladder. Transplantation of Ducts. Facial Transplantation. Transplantation of Organs. Experimental Surgery of Joints . . . Bone. Hypophysectomy in Dogs. Experimental Surgery of Lung, Trachea, and Bronchi . . . Heart. The Mechanical Heart: Cardiac Arrest. Experimental Surgery of Involuntary or Autonomic Nervous System. Vascular Surgery. A. Experimental Hematology. B. Factors Governing Restoration of Plasma Protein. Experimental Surgery of the Kidney . . . Liver . . . Prostate. Hibernation and Hypothermia. Central Nervous System.

By J. MARKOWITZ, *M.B.E., M.B. (Tor.), Ph.D., M.S. in Exp. Surg. (Minn.), Professor of Physiology, University of Toronto; Visiting Professor of Physiology, Ontario Veterinary College;* J. ARCHIBALD, *D.V.M., M.V.Sc., Dr.Med.Vet. (Giessen), M.R.C.V.S., Professor & Head of the Division of Small Animal Medicine and Surgery, Ontario Veterinary College; and* H. G. DOWNIE, *D.V.M., M.S., (Cornell), M.V.Sc., Professor & Head, Department of Physiological Sciences, Ontario Veterinary College, Guelph, Ontario*

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REFERENCES: 1. Editorial: J.M.A. Georgia **46**:433, 1957. 2. Colby, F. H.: Essential Urology, Baltimore, The Williams & Wilkins Co., 1953, p. 330.

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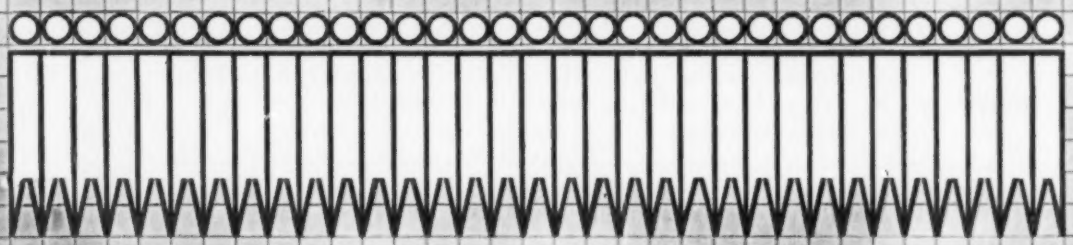

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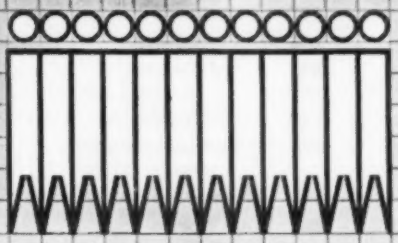

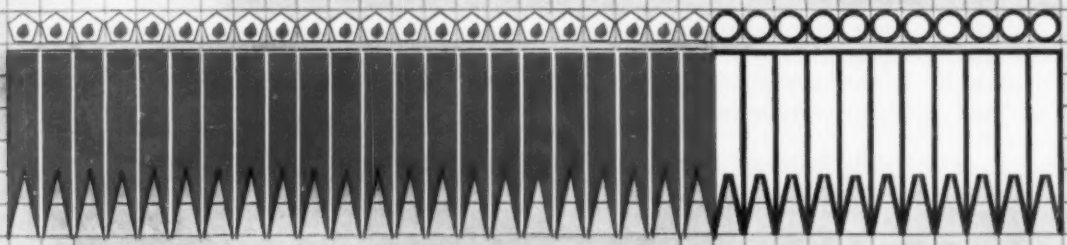

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1. Boland, E. W., and Headley, N. E.: Paper read before the Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.
2. Bunim, J. J., et al.: Paper read before the Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.

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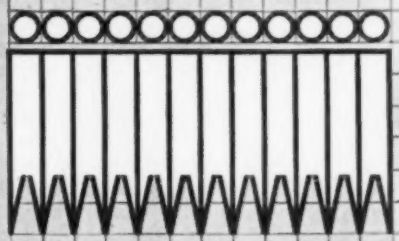

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The Journal of MEDICAL EDUCATION

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New Medical Schools: Some Preliminary Considerations*

WILLIAM R. WILLARD, M.D.†
University of Kentucky Medical Center, Lexington, Kentucky

Twelve or more groups or communities are currently considering the establishment of a new medical school. Although the relevant problems differ in various areas, there are a number of common questions which should be resolved prior to the opening of a medical school.

Accordingly, the Association of American Medical Colleges convened a small group to discuss these problems, pointing toward the preparation of the attached report. The group included Provost Russell S. Poor, Dr. Leland S. Powers, Vice-President William R. Willard, Mr. A. J. Carroll, and the editors of *The Journal of Medical Education*. The report has been reviewed and revised by this group. The responsibility for writing the report was assumed by Vice-President Willard.—JOHN Z. BOWERS, M.D., Editor-in-Chief.

INTRODUCTION

The expanding population of the country, the accomplishments of medical science, and the increasing demands for medical service have created a need, widely recognized and publicized, for more physicians. Concomitantly, there are opportunities for physicians in government service, industry, medical care administration, academic medicine, and research, in addition to private practice.

From the time of the Flexner Report in 1910 until the close of World War II, few new medical schools were established in the United States, and little was done to modernize or enlarge existing facilities. The necessity for more physicians created by World War II led to accelerated educational programs, but these constituted a temporary and unsatisfactory solution, quickly abandoned. After World War II a large number of veterans sought medical education, but only a fraction of them could be accommodated in the existing schools. In response to these varied demands, there have been eight new four-year medical schools established in the United States since 1940, and seven two-year schools converted to four-year schools. Many existing schools have increased their enrollment, so that the total student capacity in medical schools has increased by about 50 per cent. More than 1.2 billion dollars have been spent on the construction of teaching,

* These studies were made possible by a grant from the W. K. Kellogg Foundation.

EDITOR'S NOTE: There was a difference of opinion in the conference group concerning the desirability of establishing two-year Medical Schools. This reflects the national attitude on the problem. Provost Russell Poor emphasized the disadvantages of the two-year school as indicating the need for careful objective study before embarking upon such a program.

† Vice-President and Dean, University of Kentucky Medical Center.

research, and hospital facilities at medical school centers since 1948. Even so, the backlog of need has not been satisfied, and a committee of special consultants to the Secretary of Health, Education and Welfare, under the chairmanship of Dr. Stanhope Bayne-Jones, has recommended that some fourteen to twenty additional medical schools be established by 1970 to meet the projected national need for physicians.

The Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association annually receive many inquiries concerning the need for new medical schools and requests for guidance in planning them. There are at least 22 places in the United States where new medical schools are under consideration.

SOME SIGNIFICANT TRENDS IN MEDICAL EDUCATION

There are several significant trends in medical education which have important implications for planning. They will influence the provisions which should be made for new schools.

The first of these is the rapidly increasing financial support for medical research. This financial increase comes from both public tax monies and from private sources. For example, the amount of money expended by the federal government for research and training grants in the medical sciences rose from $45 million in 1940 to $330 million in 1957, an eightfold increase. Including all sources, about one-third of a billion dollars was spent for such research in 1957, and, according to the Bayne-Jones Report, the nation should spend approximately $1 billion in 1970. The demonstrated willingness of Congress to appropriate increasing amounts of money for medical research suggests that the recommendations of the Bayne-Jones Report may be realized, in substantial measure, as far as research expenditures are concerned. A large proportion of this money is being used in the medical schools. Almost any well staffed and equipped four-year medical school can obtain grants equal to or greater than its basic budget. In planning for new medical schools, it is essential that facilities be developed with adequate space to accommodate a large research program. New disciplines, such as medical genetics and atomic medicine, are being developed and expanded. The behaviorial sciences, including psychology, sociology, and anthropology, are being represented in medical school faculties and in the curricula and research programs of medical schools. New schools must be planned to accommodate new disciplines in addition to the traditional medical sciences.

Another trend is the growing concern with changes in the educational process and environment. There is increased emphasis on individualized and small group teaching, on student participation in research, and on programs of graduate level and character which require a highly competent faculty, a high faculty/student ratio, and modern research equipment for teaching. All of this is expensive.

There is also a greater concern about the way medicine is being practiced and the costs of medical and hospital care. An increasing need to coordinate specialty and ancillary services is being recognized, as is the need for continuity of care for patients and families during periods of health as well as sickness. Preventive medicine and rehabilitation are being emphasized. Group practice and the creation of special clinics and home care programs are examples of approaches to these problems. The rising costs of medical and hospital care are leading to experimentation in an effort to develop more economical methods of providing quality care. Examples include the "progressive care" concept of hospital care and efforts to integrate care in the general hospital with special institutions, out-patient clinics, and home care programs. Such experimentation requires a competent medical school faculty that is imaginative and sensitive to social needs and a hospital that the faculty can supervise for experimental approaches to patient care.

These are only a few of the trends which should be recognized in planning new medical schools. They have important implications for the teaching programs and educational methods of medical schools, and influence the size and character of the staff which is required and the design of hospitals, clinical facilities and patient care programs.

IS A NEW MEDICAL SCHOOL NEEDED HERE?

The proposal to create a new medical school in a given locality may originate with leaders in the medical profession, in the state legislature, with various leading citizens, or perhaps from the representatives of higher education. The motivations and objectives behind the interest in a new medical school may be diverse. They may reflect serious public dissatisfaction with the availability or adequacy of medical services within the area. There may be pressure from students and families for medical educational opportunities which cannot be satisfied by the existing institutions. Although opportunities for a medical education were far below their demand after World War II, the situation has improved greatly in recent years. However, the growth in population of the nation and the projected large increase in college students during the next ten to fifteen years suggest that the pressure for educational opportunities may again become acute. The desire for a new medical school may also reflect the request of local physicians for assistance in meeting some of their needs, such as better opportunities for postgraduate medical education, or for the availability of interns and residents in local hospitals where they practice. Whatever the motivations and objectives, they should be clearly identified.

Before a decision is reached to proceed with a new medical school, a study should be made to determine the health problems and needs of the area, the potential contribution of a medical school toward meeting these needs, the present resources available for medical education, and those that must be provided.

The history of many of the newer medical schools indicates that frequently several studies over a considerable period of time have been required before a decision to proceed was finally reached. Since the impact of a medical school is not completely local, but also statewide or regional in character, the study should take cognizance of local, state, and regional needs and resources. It should consider the questions: Is a medical school needed here? Is it feasible to construct and operate one now or in the foreseeable future? A firm decision on the need for and feasibility of establishing a medical school should precede a consideration of the more pragmatic factors involved in creating the school.

Such a study should be sponsored by an advisory group of interested and intelligent citizens with stature and prestige. The group should include respected representatives of the medical profession, higher education, industry, labor, and agriculture, and professional health and welfare organizations. Ideally, it should have legislative sanction if a state university medical school is contemplated.

The advisory committee should have available consultation from individuals who have experience in medical education and a broad understanding of the health problems of society. Such consultants will provide the committee with perspective and a realization of the major factors to be weighed in reaching a decision.

The consultants may direct a careful study or help the committee to find a suitable director. In the conduct of the study it is helpful to have the services of a variety of professional workers, such as a demographer, a social scientist, a statistician and an economic analyst, in addition to a competent medical educator and administrator of medical school programs. The professional competence of the study team and its fairness and objectivity must be beyond question.

Such a study may be costly. The requisite time and cost will vary according to the breadth and depth required to arrive at a

decision. If it is possible to reach a decision relatively easily and promptly, then some facts of the study may be considered after the appointment of a dean, but all of the elements must be completed at some time during the period of planning and developing a medical school. The costs for such a study are likely to exceed $100,000. Although some foundations are interested in supporting such studies, it is also wise to have financial support from local sources, such as the state government. This is desirable not only as an indication of local and official interest, but also because it may likely augur well for the acceptance of the study and its recommendations. The money should be provided without any "strings," subject only to the requirements of the survey team as approved by the advisory committee.

The decision to proceed with a medical school cannot be resolved by a simple formula. Among medical educators, however, there is a consensus on many of the basic requirements of an educational program of high quality. The manner in which these requirements are met varies greatly and is dependent in significant measure upon how satisfactorily existing local resources can be adapted and used to meet these requirements.

THE ELEMENTS OF THE STUDY

1. *An appraisal of health problems and resources.*—The necessary appraisal involves many demographic factors which must be interpreted in the light of past experience and current trends. These include a statistical enumeration of health problems, such as mortality and morbidity rates, and a comparison of these with rates in other areas in the United States; population trends; age, racial, and geographic distribution of the population; urbanization trends; ethnic and cultural factors; and the economic level of the area, including personal income and purchasing capacity of the various population segments.

The health resources of the area must also be appraised. Specifically, one must know how many physicians there are, their geographic distribution, and the trends according to age and specialty status. Data must also be compiled concerning other health personnel, including dentists, nurses, and technical assistants of various kinds; concerning the numbers of available hospital beds and geographic distribution of hospitals, clinics, rehabilitation centers, and health agencies of various kinds and their adequacy for the needs of the area according to existing standards. Consideration should be given to the question whether these can be used for medical education under conditions which can be controlled by the medical school faculty. The leadership of the medical profession is also important; is there an understanding of the requirements of quality medical education and a willingness to support the school?

Considering all the data available, what judgments can be made about the quantity and quality of health services and medical care available in an area? What are the local expectations of a prospective medical school and the possibility of their realization?

2. *The educational history of the area.*—Many areas in the United States have once had a medical school which no longer exists. Prior to 1915 there were more than 200 medical schools in this country. Many had tenuous relationships with universities and other institutions of higher learning and sometimes were located several hundred miles from the site of the school. There may be factors of pertinence in the historical background relating to medical education which the study elucidates. Similarly, the history of higher education in the state and the adequacy of its support may have much relevance. The history and status of the general public educational systems are also pertinent, because the quality of medical students available to a new school will be influenced by the character of education which its prospective students have had.

3. *The location of a medical school upon a university campus.*—One of the early and prime decisions is the location of the pro-

posed school. This can become a political issue, especially if there is rivalry between two tax-supported schools or two or more communities.

Medical education in the United States has reached its present high level in large part because of university control and affiliations. The standard of quality should be determined by university academic standards and not by any special interest groups outside the university. The recruitment of a faculty, especially in the basic sciences, is greatly facilitated by university sponsorship and by the geographic proximity of a medical school to the main university campus. Although some medical schools have been located in large urban areas, separated geographically from the university campus in order to assure an abundance of clinical material, there are various means available for insuring sufficient clinical material for the teaching and research program of a medical school, even if it is located in a small community.

The medical school can draw upon many university affiliations which are not easily duplicated; it can also bring rich resources to the university. The possibilities of strengthening the total programs in the biological and natural sciences, as well as in the social sciences, are great. The cultural environment of a university community is attractive not only to basic science faculty but to other faculty members and staff, and thus facilitates faculty recruitment. Similarly, the medical care resources of the medical school can be attractive to the non-medical school faculty.

A new medical school upon a university campus may create problems of relationship and adjustment which the university must appreciate and resolve constructively. The requirements of operating a medical school and a teaching hospital are special and different from general university operation. There are likely to be salary differentials, research facilities and opportunities, teaching loads, travel opportunities, and other perquisites which seem to favor the medical school staff. A feeling may develop upon the campus that the medical school is the beneficiary of resources which, without the medical school, would have been available to strengthen existing university programs. Some faculty members will feel that their position and status are threatened by the new medical school faculty members. Usually there are good answers to these and other concerns; they can be handled satisfactorily, but they cannot be ignored. Hence, one of the considerations in the planning phase is securing an adequate understanding of the special requirements and potential contributions of the medical school to the university.

The medical school's need for clinical material cannot be ignored, however, especially if it is to be located in a relatively small community. The advisory committee and study team should become familiar with various resolutions of this problem in existing medical schools and ascertain that an adequate plan can be developed for securing patients for the medical school program.

4. *Resources in students.*—The potential supply of able medical students must be adequate. A considerable amount of useful information on this point has been accumulated by the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association and has been published from time to time in their journals. Some of the questions that must be considered include the following: Over the past ten years, how many students from the given area applied, were accepted and went to medical school within that area? What schools do the successful applicants attend? How do they finance their medical education? How does the ratio of students to population compare with that of other states and areas? What is the quality of these applicants? Are there potential medical students who have been diverted to other careers for financial or other reasons? Are medical schools in adjoining areas especially receptive to applicants from the area under question? Is there a regional or interstate compact which provides educational opportunities for residents

of the area? Can additional students in any significant number be accommodated under the compact? In an evaluation of the resources of potential students, the projected increase in college enrollment must be considered as well as the effect of a local medical school in interesting students in the study of medicine.

5. *Relationship to neighboring medical schools and hospitals.*—Consideration must be given to the potential relationship of the proposed new medical school with any existing medical schools in the state. Can two or more schools work together harmoniously, or will they be competing for limited resources of funds and students? If a school exists, is there need for another school, or can the needs of the state or area be satisfied by strengthening and enlarging an existing school? Differences of opinion on this particular point have created serious controversy in some areas.

The character of potential relationships between the new medical school and hospitals in the immediate locality and throughout the state is also important. Can the hospitals be used for teaching and to strengthen the school's program, or will they represent a drain upon the school's resources if affiliations are undertaken? Unless the special needs of a medical school are understood, relationships with existing hospitals may be more detrimental than helpful to a new medical school. The fact that a hospital has abundant clinical material is not enough if it is to be a primary teaching resource.

ALTERNATE COURSES OF ACTION

The above considerations suggest that there may be alternatives by which the needs for medical education may be satisfied.

The first alternative is to enlarge any medical schools which already serve the area. It may prove relatively easy to strengthen the resources of existing schools to provide a better quality of program and to permit the education of a larger number of students. If the needs can be met satisfactorily in this way, it may prove wise and economical to do so.

Another less attractive but possible alternative is to establish a new two-year school. There are several existing medical schools, especially those located in metropolitan areas with access to a large amount of clinical material, which can handle more students in the third and fourth years than they can enroll in the first two years owing to limited facilities in the basic sciences. Furthermore, most medical schools have an attrition rate of about ten per cent in the first two years. The creation of good two-year schools whose students would transfer to those schools which can accommodate more students in the third and fourth years may be the cheapest way of initiating education of more physicians, although there is no unanimity of opinion that the two-year school either has been or can be an effective permanent solution to today's problems in medical education.

Nevertheless, since seven of the ten two-year schools which existed in the United States prior to 1940 have been converted to four-year schools, it can be anticipated that a new two-year school may eventually be converted to a four-year school. A two-year school will require access to clinical material to provide students with a proper clinical orientation for their basic science instruction and the opportunity to learn physical and laboratory diagnosis. However, the requirements for clinical material are modest and usually can be satisfied by affiliations with existing local hospitals. If possible, the program should be arranged to integrate with the programs of those schools to which students will transfer.

The two-year school has inherent limitations. Leading medical educators are usually interested in developing an integrated four-year program, and the probability of recruiting an outstanding dean and faculty for a two-year school is much less than it is for a four-year school. Furthermore, the impact of a two-year school upon the quality of medical care in the immediate locality and in its region is likely to be con-

siderably less than that of a four-year school. However, the economics involved in establishing and maintaining a new four-year school are such that the two-year approach may be the only one practical in some areas. Although a two-year school is cheaper than a four-year school, there is a danger that the financial requirements of a two-year school will be underestimated, with a concomitant sacrifice in quality.

The third alternative is to establish a new four-year medical school.

THE SCOPE OF THE UNDERTAKING

If preliminary investigation suggests the need for a new four-year medical school, there are further considerations which are pertinent. The first is that a four-year medical school is not an isolated phenomenon. Much more is involved than just the medical school itself, as outlined below.

1. *The graduate program.*—It is inevitable that a graduate program for Ph.D. candidates and research fellowships in the medical sciences will develop. There is increasing national emphasis upon additional training resources in the medical sciences, and federal funds are available to help support these programs. The interests of the medical school faculty in such programs insure that they will be undertaken. Furthermore, they improve the quality of medical education.

2. *Other educational programs: a Medical Center vs. a Medical School.*—Similarly, it should be recognized that the health needs of a population cannot be satisfied merely by providing more physicians, even when granted that this may be the primary need. There is likely to be need for additional nurses, for dentists, and for a variety of other professional and technical personnel, such as laboratory and x-ray technicians, physiotherapists, occupational therapists, social workers, dieticians, public health personnel, and medical record librarians. There also may be a need to build and operate a teaching hospital. Thus, the question may be whether or not it is necessary or desirable to develop a medical center with a variety of educational programs in the health field, along with a teaching hospital and clinics, rather than just a medical school. Even though many of the educational and patient care programs which might be desirable cannot be financed initially, the pressure to develop these programs may develop quickly and may be augmented by the personnel needs of the medical school and the teaching hospital. Although each new program will cost money, the additional cost is relatively modest after the medical school is established and an adequate teaching hospital is available. Thus, recognition must be given to needs in these fields as part of the planning picture, and, if no provision is made for them, the probability of their development at a later date must be considered. They will influence the way facilities are planned and their cost, the immediate and long-range staffing of the center, and the cost of the program's operation.

3. *Size of student body.*—As part of the planning process, it is important to have some concept of the size of the potential student body, which may frequently be larger than originally anticipated. There are few four-year medical schools with less than fifty medical students per class; fifty to 100 students per class appears to be optimal for quality education. A new medical school will probably have a student body of 200 to 400 students when fully operative. Since the medical school must have a teaching hospital it will recruit and supervise interns, residents, and clinical fellows, and this is an important administrative and teaching responsibility. The number of these advanced students can easily equal or exceed 100 after a few years.

It is probable also that the university or the hospital will be engaged in nursing education, and a student body of 200 nursing students even for a modest-sized school can be anticipated. Before long, perhaps, there will be pressures to develop ancillary programs in laboratory technology and in several of the other health related fields. Should dentistry or pharmacy become part

of the program, additional students will be involved.

All things considered, a medical center before long may be teaching at least 500 full-time students, and the number could easily reach 1,000 or more. In addition, there will be demands and needs for postgraduate education in medicine and in the other fields for part-time students or those taking short courses or institutes.

In planning one must take into consideration the requirements of these programs for teaching space, classrooms, seminar rooms, student laboratories, working areas for clinical practice, and offices and laboratories for the teaching staff.

4. *Staffing patterns.*—Considering the medical school alone, it may be helpful to visualize the approximate staffing requirements. A new medical school can no longer be created without provision for an adequate full-time faculty, not only in the basic sciences but also in the clinical areas. This does not preclude the use of voluntary and part-time teaching faculty drawn from the physicians in practice or from the staffs of various institutions within the area. It does mean, however, that an effective program will require a full-time staff to do the planning, to provide the leadership and much of the teaching in the clinical areas.

There are six traditional basic science departments, and some new areas are emerging. Even for a small school the minimum faculty requirements will be an average of four or five faculty members per basic science department, a total of at least 30. More will be required if these departments are to participate extensively in teaching in other health-related programs. There will be six to eight clinical departments which, as a rule, are larger than the basic science departments, depending largely upon their hospital and clinic responsibilities. According to a most conservative figure of five faculty members per department, the minimum would be about 40. In addition to the faculty, there will be secretaries, technical help, graduate students, and research assistants of various kinds. It may be anticipated that there will be at least 150 full-time faculty and staff in the various academic departments. If ample provision is made for facilities and for the academic staff, it may also be anticipated that research and training grants will increase this number to a minimum of 300, at least half of whom would be of professional level. In addition, there must be adequate administrative and service staffs.

THE NEED FOR BUILDING FACILITIES

If a new four-year medical school is contemplated, it will probably be necessary to provide new buildings to accommodate the staff and program. Occasionally, there may be one or more buildings which might be adapted to the requirements of the medical school, but this would be an exceptional situation.

Buildings can be considered under three broad headings: (1) a medical science building, (2) a patient care area (the hospital), and (3) other facilities.

1. *Medical science building.*—For convenience we may group a variety of facilities under this heading. These include teaching areas and other requirements for students; offices and research laboratories for the staff, including provisions for technical research shops, medical illustration and animal quarters; a medical library and the administrative offices. Although decisions about specific details relative to buildings should be deferred until the dean and planning staff for the medical school are assembled, the following background information may be of some help in appreciating the magnitude and character of the requirements.

The ferment in medical education has led to considerable study and some experimentation concerning the kind of student laboratories and other student facilities which should be provided. For example, specially designed interdepartmental laboratories for 16–20 students each are currently finding favor. The need for small conference and seminar rooms is being recognized, and many schools discover that previous plan-

ning did not provide sufficiently for these requirements. In addition, adequate lecture rooms and an auditorium should be provided, and in a few schools special study cubicles for students have been included near the library.

Universities and medical schools have a difficult problem in finding sufficient space for the storage of library materials. It is almost impossible, with money which has usually been available, to provide adequately for the future needs of the library. Provisions should be made for a minimum of 100,000–200,000 volumes.

The research facilities, including laboratories for the faculty, a medical illustration area, an electronics and general machine shop, and animal quarters, have occupied at least 40 per cent of the floor space of some of the newer medical science buildings.

Although the costs of medical science buildings constructed during recent years by new medical schools have varied greatly, the building needs for a staff of at least 150 professional workers and an additional 150 supporting staff, including the medical center administration, service and maintenance staff, probably cannot be satisfied for less than $4 to $6 million, plus another $1.5 million for basic equipment. Each of the new medical schools has experienced a shortage of space soon after the medical science building was completed, especially for research, graduate and postdoctoral training, and the library.

2. *Hospital and outpatient clinic and patient care facilities.*—Sometimes it is believed that an existing hospital can be used as the primary teaching base for clinical medicine in a new medical school, thus avoiding the cost of building a teaching hospital for the school. Before reaching this decision it should be established whether the existing hospital can provide satisfactory conditions and relationships with the proposed medical school to enable it to serve as a primary teaching hospital.

For example, it is important that the full-time faculty control the standards and policies of medical care in the hospital. The chairmen of the clinical departments should be named as chiefs of service, and hospital staff appointments should be reserved for those who have faculty appointments. Licensed physicians on the staff should have hospital privileges as defined by the department chairmen. The full-time staff should be able to admit and care for non-indigent patients under the limitations and conditions that are defined in the medical service plan adopted by the school in consultation with the state medical society. Principles have been developed to govern such plans which insure that the practice of the faculty will be ethical and the primary mission of the school in teaching and research will not be lost. At the same time, full-time faculty should be integrated harmoniously with the practicing physicians who serve also on the faculty and hospital staff. All patients should be teaching patients, and an adequate understanding should be reached concerning the role of private patients in the teaching program. These are difficult relationships to effect in the average private or community hospital; in fact, they may be impossible to achieve in many such institutions.

Sometimes a charity hospital for the indigent may be available as a primary teaching hospital. This is not considered a desirable pattern for hospital operation, especially for a teaching hospital. Teaching should involve patients from all social and economic levels in the population. When limited to indigent patients, the student is exposed to a distorted section of the population and does not have experience working with the kind of patients he will see most often in his practice. A hospital devoted exclusively to the care of indigent patients is likely to develop an atmosphere reflecting some callousness in the handling of patients. Because of inadequate support from tax-appropriating agencies, it may not be possible to maintain an adequate standard of care for a good teaching hospital. Furthermore, the special skills of the faculty and specialized equipment in a university teaching center should be available upon proper

referral to all economic levels of people in the area and not to one group, the indigent. In many areas the development of insurance and third-party methods of payment is making it difficult, if not impossible, to fill the hospital with indigent patients. All these factors militate against establishing a hospital which is limited to indigent patients.

Adaptability of space in the hospital for teaching requirements is of great importance to the medical school. There should be adequate and functional space for the outpatient clinic, conference rooms, central and ancillary services, research and office space for the faculty. If an existing hospital is to be used for a primary medical school teaching facility, it is probable that the needs of the medical school can be accommodated only by an addition to the hospital or by extensive remodeling with a resulting sacrifice in bed capacity. To assist in the integration of the basic science and clinical departments, so important in modern medical education, the medical science building should be adjacent to the hospital and connected by a corridor if possible.

The decision to use an existing hospital as the primary teaching facility of the medical school should be reached only after all of these considerations, and perhaps some others, have been evaluated carefully. This should include a competent architectural study of possible interior modifications or an addition to the hospital, if indicated, to satisfy the space requirements of the medical school. As a part of the preplanning phase, this study should be carried far enough to determine the feasibility of proposed changes and an estimation of their cost. Detailed planning should be left for a later stage after the decision is reached to proceed and a dean is appointed.

A commonly quoted standard of the number of hospital beds required for teaching is ten beds per student per entering class. By this standard a medical school with a class of 50 students would require a 500-bed hospital. Many medical schools operate their own teaching hospitals with fewer beds than this standard calls for. Usually such schools are able to supplement a limited number of beds by affiliations with existing hospitals, particularly Veterans Administration hospitals. Also, outpatient clinic teaching is growing in importance. If the medical center has a university-controlled hospital base of moderate size for its students and faculty, the requirements within an affiliated hospital may be less than would otherwise be the case, although the compromise is not ideal.

It is difficult to estimate the cost of hospital facilities because of the peculiar requirements and problems of each case. As a rough guide, on the assumption that a completely new university hospital and outpatient clinic is required, the figure of $25,000–$30,000 per bed may be useful. For a 500-bed hospital, completely equipped, this would amount to $12–$15 million.

3. *Other facilities.*—The possibility that dentistry, pharmacy, nursing, a variety of ancillary programs and postgraduate educational activities may become a part of the total development has already been emphasized. Too often it is assumed that somehow these programs can be conducted in the space provided for the medical school and by the staff that has accumulated for the medical school and the hospital. Whereas the medical school and hospital can be of great value to these programs, each has requirements for staff, offices, teaching, and research areas. If they are not recognized and provided for, all programs will operate under a serious handicap.

Thought must also be given to the provision of adequate living quarters for the students and staff of the medical center. Another consideration is that of an adequate power plant to meet heating and ventilating needs. Depending upon the existing resources available, these may or may not require additional construction or special provision. It is also important, in planning physical facilities, to provide for adequate parking space.

In any event, it is important in planning new construction, whether for a hospital or a

medical science building, to include expansion potentials in the plans.

THE ARCHITECT

The requirements of a medical school or center are complex, specialized, and unique. An experienced architect is essential during the planning phases, and careful attention should be given to his selection. If there are considerations which make it desirable or imperative to employ a local architect without medical center experience, he should have the guidance and direction of a consulting architect whose advice he is obligated to follow, and with whom the medical school planning staff can work intimately.

CAPITAL COST ESTIMATES

A general estimate of the building costs has been given above. The exact total cost obviously will depend upon the magnitude of the project and local conditions. In deriving estimates, one should not overlook such costs as land acquisition, site improvement and development, landscaping, foundation or unusual construction problems, architectural fees, and equipment.

Unfortunately, the usual danger is underestimating construction costs. This error is frequently made by those who are interested in promoting a new medical school and who minimize the potential cost so that approval of the project can be secured more easily. It is usually better to estimate realistically from the beginning and not be placed in the difficult and embarrassing position of having to make continuous upward estimates to the point where the validity of the whole planning operation becomes suspect.

On the basis of the cost of some of the newer four-year medical centers, including a rough allowance for increases in construction costs, a modest-sized medical center—a medical science building and a teaching hospital of 400 to 500 beds plus related facilities such as an outpatient clinic and power plant—can be constructed for a minimum of $20–$30 million. This would not include costs for acquisition and clearance of land, and probably is too low for a large metropolitan community.

OPERATING COST ESTIMATES

There should be a realistic estimate of the operating costs of the medical center program once it is fully established. The basic budget of a four-year medical school of good quality, even a small-sized school, should be projected at not less than $1.5 million per year. For most new schools designed to accommodate 75 to 100 students per class, it would be more realistic to project a basic budget of $2 million to $2.5 million.

The salary or personnel budget generally represents about 60–70 per cent of the total operating cost of a medical school. Salaries of faculty members have been increasing rapidly in recent years, more rapidly than in most other academic fields. If a top-flight faculty is to be assembled, salaries for department chairmen will have to range between $15,000 and $25,000 per year, and other faculty must be paid proportionately. Although there are many schools which do not pay salaries of this magnitude, the number is increasing, and recruitment problems are sufficiently challenging so that in a new school of unproved reputation one must be prepared to meet the competition if one is to attract quality personnel. Few faculty salaries, even at the level of instructor, can be below $7,500. If one assumes a university-supported faculty of 75, the number projected as the minimum for a small four-year medical school, the average annual salary at full development probably would be close to $12,000. When faculty, administrative, and supporting staff are calculated, this would give a salary budget of at least $900,000 to $1 million. Five or six hundred thousand dollars for other operating costs would give a total budget of at least $1.5 million.

The annual operating cost of a two-year school of good quality would be about $600,000–$700,000.

POTENTIAL SUPPLEMENTARY FUNDS

There are various sources of assistance which can be used to supplement local funds, both for capital construction and for the operating costs of the medical school, aside from gifts and endowments. The Health Research Facilities Act provides a potential source of matching grants for the construction of research facilities of the medical school. If a medical science building costing about $6 million is contemplated, and if 40 per cent of the building can be properly chargeable as research space, then one half of this 40 per cent, or 20 per cent of the total cost of the building, plus a partial allowance for equipment may be financed by a grant under the Health Research Facilities Act program. This might amount to $1.2 million for a $6 million project.

Under the Federal Hospital Survey and Construction Act (the Hill-Burton program), assistance may be available for the building of a new teaching hospital. Medical school teaching hospitals sometimes carry top priority. The percentage of the cost which can be provided varies from state to state and ranges from one-third to as high as two-thirds in some states. There are other states, however, which have adopted the policy of not allocating Hill-Burton money to projects of the state government, such as a state university medical center. Because of the large total cost for constructing a new medical center hospital, the limited size of the federal allocation to each state, and the demands for this money from many sources, it is probable that Hill-Burton money, if made available to a new medical center project, will be spread over a period of several years. Since the state's financial department may require that cash or guaranteed receivables be in hand before the contract can be let, and since Hill-Burton money is dependent upon annual appropriations by Congress and therefore cannot be "guaranteed" more than a year in advance, there may be special problems involved in financing the project with Hill-Burton assistance.

If both Hill-Burton and Health Research Facilities grant money are available, one might hope that 25 per cent to 40 per cent of the entire construction project for a medical school and teaching hospital could be covered by federal grants.

Attention has been called to the rapid increase in the research grant program and the availability of training grants. The question arises to what extent these sources of funds can offset the basic operating costs of the medical school. As policy is now developing in granting agencies, especially the National Institutes of Health, a university can expect reimbursement for faculty time spent upon many sponsored research projects. Since the research commitment of a modern medical school must be great, it may be anticipated that at least 25 per cent of the time of the basic science faculty, and therefore 25 per cent of the salaries, could be reimbursed if considered feasible from research grants. However, it takes competent faculty members to attract grant money, and for a new medical school to recruit competent faculty there must be initial guarantees of adequate salaries and positions within each department.

Thus, it is not sound planning to expect that research grants can replace the necessity of the university to underwrite an adequate basic budget for a medical school. In short, anything less than a $1.5 million basic operating budget at full development for a small school would seriously compromise the medical school in its effort to attract a good faculty and establish a good program. The salary reimbursement which may be anticipated from grant sources should be used as a resource for strengthening the medical school so that it can be truly competitive with the best established medical schools. It is probable that the staff appointed initially will be predominantly young, and there must be provision for augmenting their salaries substantially if they are to be retained.

It is the research and training grants which make possible and, in fact, almost make certain that a new medical school of

quality can double its budget, staff and scope of program within several years. In this connection one is dealing with an interesting but age-old phenomenon: If the school is adequately supported in the beginning it will grow rapidly in size, stature, and in program. If the school does not have adequate initial support there will be difficulty in attracting faculty and significant grants. It will always lag behind other schools and have a program that is considered inferior.

Professional fees earned by the full-time faculty in treating paying patients are a second possible source of financial assistance. With few exceptions, the faculty members in the clinical departments of medical schools should, and do, treat paying patients, and the fees derived from these patients are used under various plans as income for the faculty. It requires time for the development of this source of income in a new school, and, meantime, an adequate salary must be assured the faculty. There are many complex issues involved in developing this potential. Important relationships with the medical profession are among them. How this matter should be handled requires special study and consideration in each situation, and, in general, this cannot be done until a dean for the school has been appointed. Since the mission of the medical school is teaching and research, not earning money, the program of the school should be developed to keep income from patient fees to a minimum consistent with teaching and research needs and the service mission. If this is done, patient fees will constitute only a part of the income of the clinical faculty. In time this may amount to 25 per cent to 40 per cent, although it will vary with local conditions. This potential additional income is enough, however, to suggest that in the long run the university will not be contributing to the salaries for the medical school faculty from its own funds significantly more per clinical faculty member, on the average, than it pays the faculty of other schools, even though the income of the faculty member is greater.

Considering these two supplemental sources of income together, one might anticipate that if a budget of $1.5 million can be assured for a relatively small medical school, and correspondingly more for a larger school, the total budget of the school would gradually double as the program developed without requiring significant increases in the budget from regular university sources. Such an outcome, of course, is contingent upon several factors: (1) providing an initial operating budget adequate to secure competent people; (2) providing adequate facilities for the medical school faculty for research and for patient care; (3) working out an acceptable and ethical medical service plan and method for the handling of professional fees; and (4) developing proper relationships with the medical profession to avoid the serious difficulties which have confronted some of the medical schools in recent years.

Finally, consideration should be given to the financial implications of the hospital operation. Although the costs of hospital operation vary considerably in different parts of the United States, an estimate would be $30–35 per patient day after the hospital is fully activated. In general, the cost of hospital operation for a university teaching hospital may exceed that of local community hospitals, although this is not universally true, because more comprehensive services are provided and patients with more difficult, complicated illnesses are referred to these hospitals.

In addition to the cost for inpatients, there should be a realistic appraisal of the cost of operating an outpatient clinic. Here an approximate figure of five to eight dollars per patient visit is suggested, although this estimate may be on the low side.

A 400- to 500-bed hospital with 50,000 to 100,000 outpatient visits a year will probably require an operating budget of about $5 million per year, more or less.

If the hospital is available to the total population, income will be received from patients who can pay their own way and from third parties responsible for paying the

hospital bills of patients. The payments should be equal to the cost of caring for these patients, but too often this is not the case. Some states have welfare programs which finance the cost of hospitalizing the indigent and medically indigent, either fully or, more frequently, in part. In other states, such provisions are almost entirely lacking. In planning the hospital operation provision must be made for meeting the deficit between actual operating costs and anticipated income.

The cost of hospital operation is not properly chargeable to the cost of medical education; it is a cost which the state or community should bear for providing medical care rather than education.

THE RESPONSIBILITIES OF THE DEAN

A dean should be appointed as soon as possible after a firm decision has been reached to proceed with the development of a medical school. The qualifications of the dean properly can be a part of the initial study report.

The dean, if he is wise, will insist, before accepting his appointment, that he have the resources with which to appoint an adequate staff to assist him from the beginning in the detailed planning of the medical center. An initial planning budget in excess of $100,000 annually is justifiable, and this should increase steadily as staff are assembled. There are many matters relating to architectural plans, financing the project, recruiting faculty, curriculum planning, and developing good relationships with the medical profession and the various health and welfare agencies which pose important problems. They cannot be handled adequately by one person. At least a skeleton staff acquainted with the basic sciences, clinical medicine, and medical education should be hired at an early stage to obviate as many planning mistakes as possible. Research assistants for special projects will be needed, as well as assistants in recruiting and in public relations. Much of the detail in architectural planning and in the projection of departmental programs, staffs, and budgets requires, ideally, the advice and assistance of departmental chairmen; if they have not been appointed, consultation help must be employed. However careful one is, if detailed planning has preceded the appointment of department chairmen one must be prepared to make some changes in the building to accommodate their programs. If planning has been good, these will be minimal.

Two or three thousand dollars of free money should be available annually. There are a number of expenses, such as entertaining faculty prospects, which may not fall within the university policies but which must be provided for in some way. The planning and development job is an onerous one, and all necessary financial assistance should be provided.

The initial planning staff at the new University of Kentucky Medical Center in Lexington, to cite a recent example, included an internist, a specialist in medical and hospital economics, a sociologist, and a statistician, in addition to the Dean. Shortly thereafter a hospital administrator, a medical librarian, and the Dean of the College of Nursing were appointed. Appointments for the chairmen of various basic science and clinical departments followed about one and one-half years later and continued gradually until the time of program activation some four years later. A qualified and experienced consulting architect in medical school and hospital construction was appointed concurrently with the appointment of the Dean. This planning staff visited many medical centers and used extensive consultation help.

Ideally, chairmen of all departments should be available at least a year before the medical school opens. Compromises may be necessary because of recruiting problems or because a satisfactory clinical outlet is not available for certain clinical staff members. In any event, there should be some key clinical as well as basic science chairmen available when the framework of the curriculum and program are formulated.

Many new medical schools have in-

cluded as part of the initial objectives the aspiration to serve the state and region and to provide leadership in helping the state to meet its health problems and in upgrading the quality of medical care throughout the state. The degree of success or failure in this aspiration frequently can be correlated with the character and adequacy of the Dean and the planning staff. If the staff does not include individuals with a broad community and state orientation and if it is too small, it will become so preoccupied with building plans, with recruitment and the many internal problems of activating a medical school that the community and state-wide orientation will be lost and not easily regained. The faculty recruited for the established and traditional disciplines may or may not have the perspective of a broadly based and adequate planning staff. It has been said that as much time and effort is required in planning and developing the extramural aspects of a medical center program as is required in planning and activating the buildings and intramural program.

What does it take to attract a competent dean for a new medical school? The requirements go beyond the obvious ones of providing a financial inducement and the usual commitments for a faculty, including tenure, fringe benefits, and the like. These are important considerations, and, if everything else is equal, they may mean the difference between success and failure in attracting the desired person. More important, however, is the opportunity to do a creative and imaginative job in medical education. This means that there must be reasonable assurances that money will be available to provide the necessary facilities and the employment of an adequate planning staff. There must be the subtle freedoms which assure the dean the right to make the necessary decisions and to be supported in those decisions. This includes developing an organizational structure within the university which insures him the necessary authority to select staff, to define program, and reconcile program and finance within broad limits of university policy and fiscal control. There must be reasonable assurance of an increasing budget as development proceeds to permit the recruitment of staff for a quality program and for supplies, equipment, and the operation of facilities.

The selection of the right dean is perhaps the most crucial factor in determining the success or failure of the project. He should insist that the necessary "guarantees" have been made to the extent that they are legally possible. The caliber of the faculty will reflect largely his own judgment and ability in recruiting. The development and maintenance of good relationships with the medical profession and public also rests largely in his hands. The dean, with the help of his staff, will take the preliminary planning studies and the background of development of the school and translate these into a clear, imaginative and appealing statement of objectives which visualize the medical school or the medical center, not as ends in themselves, but as instruments of society to help meet the health problems of the people.

National Goals for the Construction of Medical School Facilities*

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INTRODUCTION

If this nation is to meet its long-range health needs upon a realistic and continuing basis, general agreement must be reached concerning the identification of the components essential to adequate health service and then as to the goals that can guide planning for their attainment. Whatever this constellation of components may turn out to be, there can be no disagreement over the proposition that the most important is physician personnel and the education that is essential thereto. When the goal has been set as to the needed number of physicians, planning for the required educational programs can follow. Adequate physical facilities are an essential part of this planning.

As far as the number of physicians is concerned, there now seems to be general agreement that there must be a substantial increase over the next few years (1–3, 5, 7, 8).

Many factors must be taken into consideration in estimating an optimum physician-population ratio for the years ahead. Imponderables, such as a gradual shift in age distribution toward an older population and the consequent increase in the need for future medical services, may necessitate frequent upward revision of present estimates. Estimates, based on different assumptions, naturally vary. According to the recently released report of the Surgeon General's Consultant Group (7) over 3,000 more medical graduates will be needed by 1975 to maintain the present physician-population ratio. A more conservative estimate, based on a linear projection, points toward an increase of 2,300 by 1975 over the graduating class of 1960 in order to maintain the present ratio. Still other estimates fall within these ranges, and one such estimation has been included in the 1959 Educational Number of the *Journal of the American Medical Association* (8). In discussing the future requirements for educational facilities, one paragraph from this publication is worthy of quotation:

"The fundamental issue does not involve the question of which of the various studies have resulted in the most accurate estimate of the need for increased numbers of medical school graduates. *The basic and urgent concern is that all estimates indicate a need for expansion of educational facilities in medicine in a brief period which far exceeds any expansion of such facilities that has occurred in a similar period during modern times.*" It is well to remember that the term "physician-population ratio" has no magic significance within itself. The term simply provides a meaningful way of expressing a unit measure of physician manpower. It measures head count against head count and can give no indication of the nature or

* This is the first in a series of articles to appear in *The Journal of Medical Education* dealing with national goals for medical education. Among the subjects to be dealt with in succeeding issues are national goals for financial assistance to medical students, for basic operations and research costs of medical schools, and for faculty staffing. As data and information become available, other subjects of timely interest will be developed.

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qualitative characteristics of the heads being counted. Since there has been no serious suggestion from any responsible source that we should plan for less than the maintenance of the present physician-population ratio, projections of construction dollar needs presented in this report have been developed upon this basis.

Since it requires an average of 4 years to plan and ready a new medical school for admittance of the freshman class and 4 more years before this class can graduate (not to mention the internship, residency, and military service years ahead of the average graduate before he is ready for practice) the need to initiate steps to reach this goal acquires a degree of urgency. That a significant portion of the increment in medical graduates can be met by remodeling and expanding existing institutions—a procedure more immediately productive than the construction of new institutions—underscores the point that, in looking ahead in the interests of saving time, a careful balance between the modernization and expansion of existing schools and the development of new schools must be set.

To facilitate such planning, the Association of American Medical Colleges has compiled and is here reporting information that should be helpful in planning construction for any projected need. The information to be summarized in this paper includes: (*a*) the expenditures for construction by medical schools in the United States and their affiliated institutions since the end of World War II; (*b*) the extent to which the federal government contributed financial support for construction of these facilities; (*c*) the dollar volume of construction funds needed by these schools at the present time to complete their modernization or expansion plans; (*d*) the probable source of funds should matching funds be provided and the projected building plans be implemented; (*e*) the number of additional medical students that could be enrolled if existing facilities could be satisfactorily renovated and expanded; and (*f*) a comparison of construction costs of the 10 years gone by with the present and projected needs. Combined, these sources of information should offer a frame of reference within which planning can begin for construction that will adequately accommodate the essential number of medical students.

The contemporary phase in building of facilities important to medical education began about the year 1948. Since the close of World War II, several pieces of federal legislation have stimulated building programs for hospitals and research facilities. In 1944, the Public Health Services Act established the Cancer Institute and provided funds for construction of cancer research facilities. In 1948 this Act was amended to establish the Heart Institute and authorized a related building program to house research for cardiovascular disease. In the same year, the Federal Hospital Survey and Construction Act (Hill-Burton) made available large sums of money for hospital construction. Finally, in 1956, the Public Health Services Act was broadened to include Title VII—"Medical Research Facilities"—which provided for expanded federal participation, on a matching basis, in the construction of research facilities for almost all the "crippling and killing diseases."

Information on construction expenditures since 1948, which did not involve federal participation and on the estimated needs for future construction projected over the next 5 years, was obtained by means of a questionnaire-survey addressed to the deans of all United States medical schools. Every school replied, and the information was substantially complete. Information on the total capital expenditures in which federal participation was involved and on the amounts obtained from federal and private sources was obtained through a separate communication directed to the Department of Health, Education and Welfare.

EXPENDITURES FOR CONSTRUCTION BY THE MEDICAL SCHOOLS AND THEIR AFFILIATED INSTITUTIONS SINCE 1948

The expenditures for construction of U.S. medical schools and their affiliated institutions since 1948 are shown in Table 1. Ex-

penditures which did not involve matching funds and those which included federal participation are shown separately. Enumeration is by type of facility: educational and research; medical school-owned hospitals; affiliated hospitals; and institutions other than hospitals used by the medical schools for teaching and research activities.

Excluding those which involved federal support, the cost for construction in the interests of all schools and for all types of facilities was well over ½ billion dollars (approximately $687 million). In addition, almost $947 million, involving about $218 million in federal matching funds, was spent for similar facilities during the same period. Combined, these expenditures amounted to more than 1½ billion dollars (almost $1,634 million).

Nearly half of the total construction funds (approximately $782 million) was expended by the medical schools for facilities which they owned and operated themselves. Only about one-sixth of this amount (about $115 million) was from federal sources. This means that, over the 10-year period, the schools themselves raised the remainder, or nearly $667 million.

The apportionment of construction expenditures between tax-supported and private medical schools is shown in Table 2. The difference in total expenditures between the two types of schools for all types of facilities was relatively small, $740 versus $893 million.

The total expenditures involving federal matching funds were also very nearly the same for both public and private schools, $447 versus $499 million. In each case, the ratio of federal matching funds to total expenditures was essentially the same—1:3.4 and 1:3.3, respectively.

However, large differences occurred between the public and private schools in the relative use of federal and institutional funds for the various types of facilities. For example, the public schools spent half again as much as did the private schools on educa-

TABLE 1

TOTAL EXPENDITURES FOR CONSTRUCTION OF U.S. MEDICAL SCHOOLS (PUERTO RICO INCLUDED) AND THEIR AFFILIATED INSTITUTIONS SINCE 1948

(Millions $)

Type of facility	Expenditures not involving matching funds	Expenditures involving federal matching funds	Total expenditure for construction	
Educational and and research	222.7	318.4 (80.6)*	541.1	781.6 (114.7)
Medical school-owned hospitals	112.9	127.6 (34.1)*	240.5	
Affiliated hospitals	340.6	467.9 (94.0)*	808.5	
Institutions other than hospitals used for teaching and research†	10.7	32.8 (9.6)*	43.5	
Total	686.9	946.7‡ (218.3)*	1,633.6	

* (Federal funds involved.)

† Many of these institutions are not owned and operated by the Medical School (i.e., research centers, health departments, etc.).

‡ Note for every $1 of federal funds, private, state and university sources have expended $3½.

tional and research facilities, but in so doing received less in federal funds. The ratio then of federal to institutional dollars for this type of facility was twice as favorable to the private as to the public institutions.

This larger allocation of federal funds for private education and research facilities is probably a reflection of four facts: that there are five more private than public schools; that federal funds are restricted to the construction of research facilities; that construction in favor of research has played the dominant role in the category "education and research"; and that, in the aggregate, the dollar volume of grant-supported research has been greater for the private than for the public schools of medicine ($45.8 million as opposed to $28.9 million in 1957).[1]

Again, the public medical institutions spent almost twice as much as did the private ones on school-owned and operated hospitals. In so doing, they received 3 times as many federal dollars. The resulting ratio of federal to institutional dollars was twice as favorable to the public as to the private institutions—a reversal of the situation for educational and research facilities. This would be expected, since public schools own and operate relatively more hospitals than do the private schools.

Still another relationship appeared between federal matching and institutional

[1] 1957 A.M.A.-A.A.M.C. Joint Questionnaire, unpublished data.

TABLE 2

EXPENDITURES FOR CONSTRUCTION OF U.S. MEDICAL SCHOOLS AND THEIR AFFILIATED INSTITUTIONS SINCE 1948 BY TYPE OF SUPPORT

(Millions $)

	PUBLIC			PRIVATE		
TYPE OF FACILITY	Expenditures not involving federal funds	Expenditures involving federal funds	Total	Expenditures not involving federal funds	Expenditures involving federal funds	Total
Educational and research	155.2	169.3 (32.9)*	324.5	67.5	149.1 (47.8)	216.6
Matching ratio		1:4			1:2	
Medical school-owned and operated hospitals	71.2	87.4 (26.6)	158.6	41.7	40.1 (7.6)	81.8
Matching ratio		1:2.3			1:4.3	
Affiliated hospitals	63.6	183.5 (39.2)	247.1	276.9	284.4 (54.7)	561.3
Matching ratio		1:3.7			1:4	
Institutions other than hospitals used for teaching and research	2.8	7.4 (2.5)	10.2	7.9	25.4 (7.0)	33.3
Matching ratio		1:2			1:2.6	
Total†	292.8	447.6 (101.2)	740.4	394.1	499.0 (117.1)	893.1
Matching ratio		1:3.4			1:3.3	

* Parentheses indicate federal funds involved.

† Detail may not add to totals because of rounding.

funds with respect to hospitals not owned or operated by the medical schools. Those affiliated with private schools expended twice as much as did their tax-supported counterparts. Federal funds were contributed in about the same matching ratio. Since private schools are more dependent on hospital affiliations than public ones, greater expenditures by these institutions in behalf of private schools would be expected.

The construction costs shown in Tables 1 and 2 relate to all medical schools, the 2-year as well as the 4-year. They include also the costs for ten schools that either are new or have recently built new plants. Tables 3 and 4 isolate the construction figures for these ten schools and for the four 2-year schools and relate them to the grand total for all schools of $1,633.6 million. The ten schools with new plants account for 14 per cent of the grand total for all construction. It is interesting to note that the average building cost for each new plant, including research, clinical, as well as teaching facilities, was $23.4 million (Table 3).

Table 4 lists the expenditures for school-owned facilities, excluding affiliated hospitals and other institutions. The total expenditures by all schools for education and research facilities as well as for school-owned hospitals was $781.6 million. Twenty-three per cent of this amount, or $182.5 million, was spent by the ten schools with new plants.

The ten medical schools with new plants apparently have not had as favorable a matching pattern for construction as have the older schools. Table 3 shows that the ten schools matched each federal $1 with $5, in contrast to a 1 to 3 ratio for the older schools. Table 4 shows that the ten schools also had a less favorable matching pattern with special reference to medical school-owned facilities. This is quite understandable, since new plant construction of the ten schools was intended for basic science buildings, and, consequently, only a small proportion of it could be justified in the name of research. On the other hand, the older schools, whose basic science buildings were

TABLE 3

EXPENDITURES SINCE 1948 FOR THE 2-YEAR SCHOOLS AND ALSO FOR TEN SCHOOLS THAT ARE NEW OR HAVE BUILT NEW PLANTS TABULATED SEPARATELY

(Millions $)

Type of school	All expenditures since 1948 not involving federal matching funds	All expenditures since 1948 involving federal matching funds	Total	Per cent of total
Ten schools newly developed† or new plants built since 1948	88.1	146.2 (22.8)*	234.3 (22.8)	14% (10.4)%
Matching ratio		1:5		
Two-year schools	6.9	41.5 (5.8)	48.4 (5.8)	3% (2.7)%
Matching ratio		1:6		
All other schools not included above	591.8	759.0 (189.7)	1,350.8 (189.7)	83% (86.9)%
Matching ratio		1:3		
Total	686.8	946.7 (218.3)	1,633.6 (218.3)	100% (100)%
Matching ratio		1:3.4		

* Parentheses indicate federal funds.

† Arkansas, U.C.L.A., U. of Florida, Einstein, Miami, Mississippi, North Carolina, U. of Washington, Kentucky, Missouri.

already completed, could justify most of the new construction as being in the interests of research.

All but three of the ten new institutions received Hill-Burton funds. It is not clear why federal matching fund ratios are less favorable for their hospital constructon programs than for those of the older schools.

The sources of funds for federal grants to medical schools and their affiliated institutions since 1948 are presented in Table 5. The fact that federal funds are designated mainly for hospital and research facilities is amply demonstrated. The $2 million of Hill-Burton money (a hospital funding program) ascribed to the category of educational and research facilities might seem misplaced. It is presumed, however, that these funds cover bed-care facilities for metabolic and similar research activities conducted by the medical schools themselves.

TABLE 4

COMPARISON OF EXPENDITURES ON SCHOOL-OWNED FACILITIES FOR THE TEN SCHOOLS WITH NEW PLANTS AND FOR ALL OTHER SCHOOLS

(Millions $)

	Expenditures not involving federal matching funds		Expenditures involving federal matching funds		Totals		
Type of facility	Ten new plant schools	All other schools	Ten new plant schools	All other schools	Ten new plant schools	All other schools	Grand total
Educational and research	67.4	155.3	56.6 (7.9)*	261.8 (72.7)	124.0	417.1	541.1
Matching ratio			1:6.2	1:2.6			
Medical school-owned hospitals	15.1	97.8	43.4 (9.4)	84.2 (24.7)	58.5	182.0	240.5
Matching ratio			1:3.6	1:2.4			
Total	82.5	253.1	100.0 (17.3)	346.0 (97.4)	182.5 (17.3)	599.1 (97.4)	781.6 (114.7)
Matching ratio			1:4.8	1:2.6			
Per cent of Total					23.3% (15.1%)	76.7% (84.9%)	100.0% (100.0%)

* Parentheses indicate federal funds.

TABLE 5

FEDERAL GRANTS FOR MEDICAL SCHOOLS AND THEIR AFFILIATED INSTITUTIONS BY SOURCE SINCE 1948

(Millions $)

Type of facility	Hill-Burton	Research facilities	Cancer and heart research	Total
Educational and research	2.0	68.4	10.2	80.6
Medical school-owned hospitals	32.1	1.0	1.0	34.1
Affiliated hospitals	72.1	14.2	7.7	94.0
Institutions other than hospitals used for teaching and research	6.9	1.9	.8	9.6
Total	113.1	85.5	19.7	218.3

THE DOLLAR VOLUME OF CONSTRUCTION FUNDS NEEDED BY U.S. MEDICAL SCHOOLS AT THE PRESENT TIME

The expenditure of well over 1½ billion dollars during the past 10 years for construction in the interests of medical schools and their affiliated institutions is an impressive figure. Since this sum far exceeds the amount that is called for to meet the needs of these schools in the immediate future, it is felt that the task ahead is not an unreasonable one. Table 6 provides the basis for this opinion.

out that eighteen of the twenty schools studied allocated 48 per cent of the planned construction costs to research buildings during the period 1958–60, and 27 per cent during the more inclusive period 1958–70. In the present study of construction costs planned over the next 5 years, *all* schools together allocated about 20 per cent of their total need for construction of research facilities, an average of almost $2 million per school. With the American public rapidly increasing its investment in medical research, this amount to be spent by existing

TABLE 6

PRESENT DOLLAR NEEDS FOR CONSTRUCTION CONTRASTED WITH EXPENDITURES SINCE 1948*

(Millions $)

	Type of facility					
	Educational (new construction and rehabilitation)	Research space	Owned and operated hospitals	Affiliated hospitals	Institutions other than hospitals used for teaching and research	Total
Present dollar needs for construction	324.5	155.3	308.9†			788.6
Expenditures since 1948	541.1‡		240.5	808.5	43.5	1,633.6

* Not included is a considerable need expressed by the deans for miscellaneous facilities, such as student and faculty housing, student recreational areas, etc.

† The present needs for hospital and O. P. D. space involve both University-owned and major affiliated hospitals.

‡ This expenditure is for both Educational and Research Facilities.

The estimate recently made by the deans of all medical schools of dollar needs for the construction of all types of facilities was close to $789 million. Approximately two-fifths of this amount ($324.5 million) is needed for educational and research facilities, another two-fifths ($308.9 million) for medical school-owned or affiliated hospitals, and the remainder ($155.3 million) for research space.

The sum currently needed for research facilities is less than half of that cited for educational facilities. In Part v of "A Study of Twenty Medical Schools" (6) recently compiled by the Department of Health, Education and Welfare, it is pointed

schools over a 5-year period should appear as a reasonable and attainable goal.

Table 6 also compares the estimated current construction needs with the amounts spent for similar facilities during the previous 10 years and shows that the past expenditures exceed present needs by almost $1 billion.

The estimated costs for construction and rehabilitation of educational and research facilities (excluding hospitals) are about $60 million less than was spent for similar facilities since 1948; those for hospital and out-patient facilities are about one-third the amount expended for comparable facilities during the last 10 years.

Table 7 reveals that the major need for educational facilities is for new construction ($288.6 million) and this mainly by the older schools ($256.2 million). Considering that 61 per cent of the basic science buildings were completed before 1930, and that 23 per cent of them antidate 1905, this fact is not surprising.

THE PROBABLE SOURCE OF FUNDS SHOULD MATCHING FUNDS BE PROVIDED AND THE PROJECTED BUILDING PLANS BE IMPLEMENTED

Over $300 million is presently needed by medical schools for new construction and rehabilitation of teaching facilities (exclusive of research and hospital facilities). If construction funds immediately should become available upon a matching basis, how would a medical school raise its share? Answers to the above item on the questionnaire are shown in Table 8. It is noteworthy that none of the schools indicated reliance on endowment funds alone. Half of the schools responded that the necessary matching sums could be raised through gifts, grants, and donations; about one-fourth of them indicated that funds could be raised through state, municipal or university funds. The remaining schools indicated that their share of matching funds would be raised from a combination of these sources. Nine schools did not respond to this particular item.

TABLE 7

PRESENT NEEDS OF ALL U.S. MEDICAL SCHOOLS FOR CONSTRUCTION AND REHABILITATION OF EDUCATIONAL FACILITIES WITH THE 2-YEAR SCHOOLS AND THE TEN SCHOOLS THAT ARE NEW OR HAVE BUILT NEW PLANTS SINCE 1948 TABULATED SEPARATELY

(Millions $)

Type of school	New construction	Re-habilitation	Total
Ten schools newly developed or new plants built since 1948	28.3		28.3
Two-year schools	4.1		4.1
All other schools not included above	256.2	35.9	292.1
Total	288.6	35.9	324.5

TABLE 8

PROBABLE SOURCE OF FUNDS WHICH COULD BE RAISED ON A MATCHING BASIS FOR FUTURE CONSTRUCTION

A) State, Municipal, and University	22
B) Endowment only	0
C) Gifts, grants, and donations	42
D) Combination A and C	9
E) Combination B and C	3
F) Not reported	9
Total Schools	85

THE ESTIMATED INCREASE IN ENROLLMENTS IF FUNDS FOR CONSTRUCTION WERE IMMEDIATELY AVAILABLE

One of the principal justifications for the large expenditures of construction funds over the next few years is the effect they would have on increasing medical school enrollments. However, it should be stated that large expenditures of capital are needed to modernize existing medical school facilities regardless of their ultimate effect on enrollment. The schools must have modern facilities for students presently enrolled, and in this respect many are wanting. However, as previously stated, the constantly increasing population in the United States requires an increasing annual number of medical graduates. The expansion of existing medi-

cal schools is one way of contributing to this increase.

Table 9 shows that, if the presently needed construction could be completed, in addition to modernizing the plants in favor of students presently enrolled, space for 1,060 additional freshmen could be provided.

Largely owing to drop-outs during the first and second years, the 4-year schools reported that they had 760 vacancies in their third-year classes. At present, we have four 2-year schools which provide each year approximately 140 students to fill third year vacancies in the 4-year schools. More

TABLE 9

ESTIMATED INCREASE IN ENROLLMENTS IF FUNDS FOR CONSTRUCTION WERE IMMEDIATELY AVAILABLE

Schools	Entering freshman class	Third-year clinical students	Total additional students
78 full 4-yr. schools	973	760	1,733
3 new 4-yr. schools	32	—	32
4 2-yr. schools	55	—	55
Total	1,060	760	1,820

are needed to fill the additional 760 existing vacancies.

THE CONSTRUCTION GOAL FOR THE NEXT FIFTEEN YEARS

If the American public wishes to maintain its present physician-population ratio, it must assume responsibility for providing adequate facilities to house its medical educational programs.

At the beginning of this paper, it was stated that if the present physician-population ratio were to be maintained, by 1975 the annual number of medical graduates would have to be substantially increased. How then do we arrive at a working estimate of the required annual production of medical graduates on which to base our construction plans?

The average number of medical graduates per year over the last 30 years has been at the rate of 30 per 1,000 licensed physicians (M.D.'s). This proportion of U.S. graduates plus an additional number of foreign licenciates has permitted the maintenance of a physician-population ratio of approximately 132 physicians per 100,000 population. By 1975, when the population of the United States is expected to reach 235 million, 310,523 physicians will be needed to maintain this ratio. At the rate of 30 medical graduates per 1,000 licensed physicians, about 9,300 graduates per year will be needed by then to fill the quota of physicians (Table 10).

In estimating the 1975 need for 11,000 graduates, the Surgeon General's Consultant Group (7) offers a higher figure. This difference is in part accounted for because of the inclusion of 500 graduates in osteopathic medicine. This correction gives a figure of 10,500 graduates of approved medical schools. The difference between this figure and the 9,300 developed above is accounted for by the Consultants' anticipation of variables not taken into account in making a simple linear estimate (4). A linear projection developed in terms of the fairly constant ratios of physicians to population and U.S. graduates to licensed physicians over the past 30 years provides a base against which either anticipated or unanticipated developments that may call for adjustment can quickly be appreciated. To maintain this equilibrium, the number of medical graduates per 1,000 licensed physicians would have to be immediately increased if the physician-population ratio should show a downward shift.

Because of the usual attrition rate through the 4 years of medical school of approximately 10 per cent, 10,350 freshmen medical students would have to be enrolled in 1971 to produce 9,300 graduates in 1975. Planning the new schools will, therefore, have to be based on the number of first-year entering students to be accommodated (Table 11). In 1958 the freshman enrollment was only 8,130 students. Without any expansion of present facilities, a conservative estimate

of the maximum freshman enrollment that could be achieved by 1960 (including students at the University of Kentucky) might approach 8,250.

However, the deans of the U.S. schools indicated that 1,060 additional freshmen students could be accommodated by 1966 if the needed expansion and rehabilitation of the present plants were financed. By so doing, the existing schools could probably admit a maximum of 9,400 first-year students by 1966. This class, graduating 4 years later (1970) will number 8,460—still sufficient to meet requirements. In the next year, however, this number of graduates would fall short of meeting the requirement. Therefore, classes starting in 1967 will have to be materially augmented. By then, at least one additional 4-year school must be completed and ready to admit a freshman class. Starting in 1968, at least two more 4-year medical schools must be completed each year until 1976, when three will be required (Table 12).

If the Surgeon General's Consultant Group's estimate of 10,500 M.D. graduates by 1975 were to be met (requiring 11,667 freshmen admissions in 1971, 21 new 4-year schools would be needed by 1971 and an additional twelve more by 1976. Thus, if the Surgeon General's recommendations were followed, a total of 33 new schools would have to be in operation by 1976. This is thirteen more schools than the estimate shown in Table 12.

Owing to student attrition, vacancies presently exist in the junior classes of the 4-year schools and probably always will exist. In the early phase of the building program additional 2-year programs in the basic sciences might be a more economical way to immediately increase enrollments and provide students to fill the junior vacancies. Such programs might eventually

TABLE 10

ESTIMATED PHYSICIANS AND MEDICAL SCHOOL GRADUATES NEEDED TO MAINTAIN PRESENT PHYSICIAN-POPULATION RATIO OF 132 PER 100,000

Year	Total U.S. population*	Total licensed physicians†	Physicins per 100,000 population	Medical school graduates‡	Medical school graduates per 1,000 licensed physicians
1930	123,188,000	154,455	125.4	4,565	29.6
1935	127,362,000	163,261	128.2	5,101	31.2
1940	132,122,000	175,163	132.6	5,097	29.1
1945	139,928,000	188,289	134.6	5,136	27.3
1950	151,683,000	201,277	132.7	5,553	27.6
1955	165,270,000	215,262	130.2	6,977	32.4
Projection					
1960	180,126,000	237,766	132.0	7,133	30.0
1965	195,747,000	258,386	132.0	7,751	30.0
1970	213,810,000	282,229	132.0	8,467	30.0
1975	235,246,000	310,523	132.0	9,315	30.0
1980	259,981,000	343,175	132.0	10,295	30.0

* Bureau of Census, Stat. Abst. 79th Ed. (Series II projection).

† A.M.A. Directory, 1958, p. 12.

‡ A.A.M.C. Records.

TABLE 11

FIRST YEAR ENROLLMENT NECESSARY TO PRODUCE REQUIRED NUMBER OF GRADUATES, 1956-76

No. 1st-Yr. Students			Graduates (10% Attrition Rate)	
Year	Number		Year	Number
1956	7,824*		1960	7,133
1961	8,612		1965	7,751
1966	9,408	Graduating	1970	8,467
		(4 Yrs. Later)		
1971	10,350		1975	9,315
1976	11,439		1980	10,295

* Actual number.

convert to 4-year schools. If the 2-year programs average 50 students per class, two such programs can be substituted for each 4-year program and thus provide for an equivalent number of students. As far as relative costs are concerned, at the present valuation of the dollar, each 2-year program is estimated to cost about $7–$8 million. Four-year schools are estimated to cost $30 million. These estimates exclude land acquisition and improvement costs.

And while speaking of economical means of increasing the number of medical graduates the point must be kept in mind that in the rehabilitation and expansion of existing schools beyond the 1060 new admissions already anticipated, for every 100 freshmen admitted beyond this figure, any projection of need can eliminate one new 4-year or two 2-year schools.

TABLE 12

YEAR NEW SCHOOLS MUST BE COMPLETED; NUMBER OF FIRST-YEAR PLACES AND GRADUATES, 1966–77

Academic yr. completed & 1st class admitted	No. new 4-yr. schools	Additional 1st-year students	No. Sept. admissions	No. June graduates who entered 4 yrs. earlier
1966–67*			9,400	8,031
1967–68	1	100	9,500	8,172
1968–69	2	200	9,700	8,315
1969–70	2	200	9,900	8,460
1970–71	2	200	10,100	8,550
1971–72	2	200	10,300	8,730
1972–73	2	200	10,500	8,910
1973–74	2	200	10,700	9,090
1974–75	2	200	10,900	9,270
1975–76	2	200	11,100	9,450
1976–77	3	300	11,400	9,630
Totals	20	2,000		

* Expected enrollment of present medical schools, including University of Kentucky.

SUMMARY

1. The expenditures for construction by all U.S. medical schools and their affiliated institutions since 1948 are presented. These totaled $1,633.6 million. The distribution of construction expenditures among educational and research buildings, medical school-owned hospitals, affiliated hospitals and institutions other than hospitals that are used for teaching and research is discussed. Expenditures in the interests of ten medical schools with new plants have been isolated from the total in order to give an appreciation of the average costs for new plants.

2. The extent to which the federal government participated in the construction program and the source of federal funds are discussed. The federal contribution of $218.3 million accounts for only a small portion of the total expenditures. Consideration is given to the relative importance of federal funds for the public, private, and the ten schools with new plants.

3. The dollar volume of construction funds needed by U.S. medical schools at the present time to complete modernization and expansion programs is estimated by the deans to be $788.6 million. This includes $324.5 million for new construction and rehabilitation of educational facilities; $155.3 million for research space; and $308.9 million for hospital and out-patient facilities. A comparison is made between the future construction needs of existing schools and their expenditures for comparable facilities over the past 10 years.

4. The probable sources of funds to be raised by the medical schools on a matching basis for implementation of present construction plans are shown.

5. The estimated increase in first-year enrollments which could be effectuated if funds for expansion of existing facilities were immediately available is 1,060.

6. To maintain the present physician-population ratio through 1976, twenty new 4-year schools, or an equivalent expansion of existing schools, will have to be in operation by that time to accommodate essential student enrollments. This requirement of twenty more schools is based on a simple linear projection predicated upon the maintenance of the past 30 years' average of 132 physicians per 100,000 population and 30 medical graduates per year per 1,000 licensed physicians. Any developments that may result in unfavorable shifts in these averages will call for appropriate adjustments.

REFERENCES

1. Bayne-Jones Report: The Advancement of Medical Research and Education: Report of Secretary's Consultants on Medical Research and Education. Washington, D.C.: Dept. of Health, Educ. & Welfare, 1958.
2. DARLEY, W. Studies and Research in Medical Education: Their Timeliness and Importance. J. M. Educ., **34**:625–30, 1959.
3. Editorial. J. M. Educ., **32**:47–48, 1957.
4. PERROTT, G. ST. J., and PENNELL, M. Y. Physicians in the United States: Projections 1955–75. J. M. Educ., **33**:638–44, 1958.
5. Proceedings of the House of Delegates of A.M.A., Report of Council on Medical Education & Hospitals. J.A.M.A., **169**:606, 1959.
6. Report from Staff Committee on Support for Research and Training. Bethesda: Dept. Health, Educ. & Welfare, Pub. Health Serv., N.I.H., 1959.
7. Surgeon General's Consultant Group on Medical Education. Physicians for a Growing America. Washington, D.C.: Dept. Health, Educ. & Welfare, Pub. Health Serv., 1959.
8. WIGGINS, W. S., SHEPHARD, G. R.; HINMAN, J.; and TIPNER, A. Medical Education in the United States and Canada. J.A.M.A., **171**: 1508–75, 1959.

The Study of Applicants, 1958–59

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INTRODUCTORY NOTE

The organization of the applicant study report this year differs in some respects from previous studies. It is divided into four general sections and an appendix. In the first section, attention is directed to trends in the recruitment and admission of applicants to medical school, such as changes in the size and make-up of the applicant group and changes in the differences between accepted and rejected applicants. The second section focuses on what appear to be some general practices on the part of admissions committees in their choice of applicant characteristics as criteria for selecting students. The third section considers two selection factors—age and Medical College Admission Test (MCAT) scores—as possible dropout indicators. The fourth section deals with some questions concerning the efficiency with which potential talent for medicine is being developed and utilized. Two tables—reporting detailed classifications and showing substantially no change from previous years—have been consigned to an appendix.

TABLE 1

SUMMARY OF APPLICATION ACTIVITY DURING THE PAST 9 YEARS

First-year class	No. applications	No. individuals	Applications per individual
1950–51	81,931	22,279	3.7
1951–52	70,678	19,920	3.5
1952–53	56,319	16,763	3.4
1953–54	48,586	14,678	3.3
1954–55	47,568	14,538	3.3
1955–56	54,161	14,937	3.6
1956–57	59,798	15,917	3.8
1957–58	60,951	15,791	3.9
1958–59	59,102	15,170	3.9

TRENDS IN THE RECRUITMENT AND ADMISSION OF APPLICANTS

One of the more striking facts about applicants to the first-year medical classes of 1958–59 is that they have decreased in number for the second consecutive year (Table 1). Furthermore, the magnitude of the decrease this year is 4 per cent, as compared with the 1 per cent decrease reported last year. Unlike 1957–58, this year's decline in the size of the applicant group cannot be attributed to a decline in the number of repeat applicants—that is, in the size of the group of applicants who failed to gain acceptance in previous years and are now reapplying. The total number of applicants this year fell 621 below last year, and the number of first-time applicants fell proportionately by 536. There is little question but that medical education as a whole faces a recruitment problem.

It has been suggested that the increase in applicants during 1955 and 1956 reflects the uneven progress of students whose premedical careers were interrupted by military service during the Korean conflict. The temporary rises in 1955 and 1956 would then be expected, as would the subsequent decline that has in fact been noted. This interpretation is contradicted, however, by the steady rise in numbers of college graduates during recent years (Table 2) and the decline in proportion of college graduates who apply to medical school.

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What might underlie the apparent decline of interest in medicine? The authors last spring (2) speculated that the increasing glamor of engineering and the physical sciences in recent years may have drawn away from medicine many able students with special quantitative aptitude. This speculation seemed consistent with the finding in recent years that the medical applicant group was rising in verbal aptitude and falling in quantitative aptitude as measured by the Medical College Admission Test (MCAT). A recent report issued by the Engineering Manpower Commission of Engineers Joint Council, in cooperation with the American Society for Engineering Education, sheds some light on this matter (1). Its figures reveal that in 1952 and 1953 engineering students constituted the major part of the increase in enrollment in undergraduate colleges that occurred in that period. In 1954 and 1955, however, which are the years in which the 1958 first-year medical students entered undergraduate colleges, the increase in engineering enrollment accounted for only a small proportion of all undergraduate enrollment increases. It is perhaps significant for the medical applicant picture in 1961 that engineering enrollment dropped 11 per cent between 1957 and 1958, whereas enrollment in physical science departments was reported to have increased. To summarize, there is no evidence that the decline in medical applicants can be attributed to increased interest in engineering. However, the figures suggest that by 1961 medical schools may experience a definite increase in competition with graduate programs in the physical sciences. By the same token, they may find an increasing pool of physical science majors from which to recruit their applicants.

Looking elsewhere for an explanation for the present decline in applications one can postulate that the decline in medical applicants may in some way reflect broad changes in the nation's geographic, demographic, and economic characteristics. An examination of one of these possibilities, the geographic, revealed that the decline in applicants is distributed fairly uniformly throughout the nation (Table 3), i.e., the geographic *pattern* of applicant rates per population remains substantially similar to that of last year. Demographic statistics dictate that the number of applicants should be increasing. No pertinent information is available concerning economic trends.

A more encouraging characteristic of this year's applicant group is the reversal of the recent trend toward lower quantitative aptitude and science achievement as measured by the MCAT (Table 4*a*). This year's science achievement mean is up 6 points from last year, although it remains some 12 score points below the 1951 standardization group mean. As for quantitative aptitude, the 1958 group's mean score is the highest any applicant group has attained since present forms of the test were standardized.

TABLE 2

NUMBER OF MEDICAL SCHOOL APPLICANTS COMPARED WITH NUMBER RECEIVING BACHEOR AND FIRST PROFESSIONAL DEGREES

Year undergraduate degree conferred	No. receiving undergraduate degrees*	No. applicants to the medical first-year class entering the same year	Ratio of medical applicants to graduates
1951	384,352	19,920	.052
1952	331,924	16,763	.051
1953	304,857	14,678	.048
1954	292,880	14,538	.050
1955	287,401	14,937	.052
1956	311,298	15,917	.051
1957	340,347	15,791	.046
1958	365,748	15,170	.041

* Figures from Office of Education, U.S. Department of Health, Education and Welfare, "Earned Degrees Conferred by Higher Educational Institutions," in its *Statistical Abstracts*.

More impressive than the MCAT scores of the applicant group as a whole are those obtained by accepted applicants. MCAT performance is playing an increasingly important role in the selection process (Table 4*b*). The disparity in performance of accepted and rejected applicants on the quantitative and science sections of the MCAT has gradually widened over the past 7 years, but never as sharply as during the last year. Teachers of the more quantitative-

TABLE 3

MEDICAL SCHOOL APPLICANTS AND ACCEPTANCES PER STATE POPULATION, 1958–59

State	Population (×1,000)	No. applicants	Applicants per 100,000 population	Per cent of total applicants	No. acceptances	Acceptances per 100,000 population	Per cent of total acceptances
Alabama	3,136	218	6.95	1.4	114	3.64	1.4
Arizona	1,053	78	7.41	.5	45	4.27	.5
Arkansas	1,757	185	10.53	1.2	113	6.43	1.4
California	13,551	1,008	7.44	6.6	468	3.45	5.6
Colorado	1,624	172	10.59	1.1	104	6.40	1.2
Connecticut	2,257	191	8.46	1.3	99	4.39	1.2
Delaware	426	31	7.28	.2	20	4.69	.2
District of Columbia	798	132	16.54	.9	61	7.64	.7
Florida	4,111	313	7.61	2.1	181	4.40	2.2
Georgia	3,691	327	8.86	2.2	175	4.74	2.1
Idaho	640	48	7.50	.3	29	4.53	.3
Illinois	9,647	741	7.68	4.9	430	4.46	5.1
Indiana	4,499	359	7.98	2.4	195	4.33	2.3
Iowa	2,781	217	7.80	1.4	154	5.54	1.8
Kansas	2,058	156	7.58	1.0	97	4.71	1.2
Kentucky	3,003	246	8.19	1.6	134	4.46	1.6
Louisiana	3,022	283	9.36	1.9	168	5.56	2.0
Maine	923	27	2.93	.2	16	1.73	.2
Maryland	2,830	244	8.62	1.6	133	4.70	1.6
Massachusetts	4,775	460	9.63	3.0	226	4.73	2.7
Michigan	7,691	579	7.53	3.8	359	4.67	4.3
Minnesota	3,312	248	7.49	1.6	171	5.16	2.0
Mississippi	2,150	190	8.84	1.3	112	5.21	1.3
Missouri	4,210	269	6.39	1.8	171	4.06	2.0
Montana	666	54	8.11	.4	26	3.90	.3
Nebraska	1,424	166	11.66	1.1	106	7.44	1.3
Nevada	253	22	8.70	.1	12	4.74	.1
New Hampshire	566	32	5.65	.2	21	3.71	.3
New Jersey	5,572	594	10.66	3.9	319	5.73	3.8
New Mexico	789	34	4.31	.2	19	2.41	.2
New York	16,098	2,074	12.88	13.7	1,126	6.99	13.5
North Carolina	4,388	314	7.16	2.1	150	3.42	1.8
North Dakota	644	53	8.23	.3	35	5.43	.4
Ohio	9,186	784	8.53	5.2	444	4.83	5.3
Oklahoma	2,221	196	8.82	1.3	131	5.90	1.6
Oregon	1,739	149	8.57	1.0	80	4.60	1.0
Pennsylvania	10,990	1,120	10.19	7.4	616	5.61	7.4
Rhode Island	828	60	7.25	.4	22	2.66	.3
South Carolina	2,311	222	9.61	1.5	106	4.59	1.3
South Dakota	687	50	7.28	.3	39	5.68	.5
Tennessee	3,423	311	9.09	2.1	214	6.25	2.6
Texas	8,989	661	7.35	4.4	342	3.80	4.1
Utah	836	109	13.04	.7	45	5.38	.5
Vermont	368	17	4.62	.1	12	3.26	.1
Virginia	3,664	287	7.83	1.9	168	4.59	2.0
Washington	2,653	176	6.63	1.2	96	3.62	1.1
West Virginia	1,962	144	7.34	.9	67	3.41	.8
Wisconsin	3,855	255	6.61	1.7	180	4.67	2.2
Wyoming	310	22	7.10	.1	10	3.23	.1
Alaska, and U.S. Possessions, Territories	738	70	9.49	.5	31	4.20	.4
Puerto Rico	2,272	116	5.11	.7	63	2.77	.8
Foreign		294		1.9	93		1.1
Not stated		62		.4	18		.2
Total		15,170		100.0	8,366		100.0

ly oriented basic medical sciences will be encouraged to learn that, whereas last year the mean quantitative learning ability of first-year students was below 500 in 24 schools, this is true in only sixteen schools this year. At the upper end of the scale, 27 schools this year, as opposed to seventeen last year, have mean quantitative ability scores above 550 (Table 5).

The improvement in MCAT performance in this year's applicant group was due entirely to the superior performance of the first-time applicants (Table 6). This year's repeater group was nearly identical in MCAT performance to the repeater group of last year. Nevertheless, 39 per cent of the repeaters were admitted, as compared with 37 per cent in the previous year.

It is noteworthy also that the higher science and quantitative MCAT levels of the accepted applicants were achieved without reducing the percentage of applicants admitted. In all, 55 per cent gained admission in 1958 (59 per cent of the first-time applicants), as compared with 53 per cent in 1957 and 52 per cent in 1956. The higher percentage of applicants admitted this year is associated with both the 4 per cent decrease in number of applicants and an increase in number of medical school places available. About 1 per cent more applicants, 68 more in number, entered medical school in the fall of 1958 as compared with the previous year. Again, as in past years, more than 5 per cent of the accepted applicants failed to enter any medical school.

To sum up recruitment and admission trends, applicants are fewer in number, and more of them are gaining admission to medical school. However, the aptitudes of admitted applicants are approximately equal or superior to those of the classes admitted when applicants were more numerous. Results of MCAT administrations during 1958 suggest that these trends will continue among the 1959–60 applicants—a continued decline in number, but maintenance of the 1958–59 level with respect to MCAT performance.

TABLE 4*a*

MEAN MCAT SCORES OF ACCEPTED AND REJECTED APPLICANTS DURING THE PAST 7 YEARS

	Accepted applicants						Rejected applicants						Total applicants					
Year	VA	QA	MS	Sc	No. taking MCAT	Total N	VA	QA	MS	Sc	No. taking MCAT*	Total N	VA	QA	MS	Sc	No. taking MCAT*	Total N
1952–53	522	526	519	525	7,346	7,778	465	459	467	457	7,398	8,985	493	492	493	491	14,744	16,763
1953–54	519	525	524	530	7,426	7,756	461	457	472	460	5,801	6,922	494	495	501	499	13,227	14,678
1954–55	517	521	530	533	7,527	7,878	457	455	473	459	5,661*	6,660	491	493	506	501	13,188*	14,538
1955–56	524	528	527	522	7,688	7,969	466	459	476	454	6,652*	6,968	497	496	503	490	14,340*	14,937
1956–57	525	525	526	519	8,012	8,263	463	458	473	445	6,859	7,654	496	494	502	485	14,871	15,917
1957–58	528	517	527	516	8,223	8,302	467	452	472	442	6,840	7,489	500	487	502	482	15,063	15,791
1958–59	527	532	520	523	8,301	8,366	461	456	467	441	6,305	6,804	499	499	497	488	14,606	15,170

* Estimated.

ADMISSION PRACTICES FACED BY APPLICANTS AROUND THE NATION

One of the outstanding features of admission practices is their variation from region to region, state to state, and school to school. A really comprehensive report on admission practices would, therefore, require a separate analysis of admissions to each medical school, or perhaps small groups of medical schools. Such a study is far beyond the scope of the present report, however desirable the more comprehensive analysis might be. In general, several factors are relevant in any discussion of admission practices—among them school ownership, geographical location, MCAT scores, and age of applicants. The status of these variables in the 1958–59 applicant picture are presented in the following paragraphs.

School ownership has been considered in previous applicant studies. It is repeated again because of the particular clarity with which trends observed in earlier years appear again this year (Table 7). The presence of a publicly owned medical school in a state appreciably enhances the probability that an applicant will be accepted. Twenty of the 34 states that have a publicly owned medical school reach an admission rate of more than 56 per cent of their applicants. Only five of the sixteen remaining states do so.

Although applicants generally find that the older they are, the lesser are their chances of gaining admission to medical school, applicants from some regions find age a less important factor than do their peers elsewhere (Table 8). On a national scale, the average rejected applicant, born in September, 1934, is a year and a half older than the

TABLE 4*b*

DIFFERENCES BETWEEN MEAN MCAT SCORES OF ACCEPTED AND REJECTED APPLICANTS DURING THE PAST 7 YEARS

	Mean MCAT difference			
Year	VA	QA	MS	Sc
1952–53	57	67	52	68
1953–54	58	68	52	70
1954–55	60	66	57	74
1955–56	58	69	51	68
1956–57	62	67	53	74
1957–58	61	65	55	74
1958–59	66	76	53	82

TABLE 5

DISTRIBUTION OF MCAT SCORE MEANS OF ENROLLED STUDENTS AND TOTAL APPLICANT GROUPS IN 85 U.S. MEDICAL SCHOOLS

	Number of schools with mean scores at each MCAT score interval							
	Verbal		Quantitative		Modern Society		Science	
Mean MCAT score intervals	Enrolled	Applicant	Enrolled	Applicant	Enrolled	Applicant	Enrolled	Applicant
600 and over	5	0	3	0	1	0	4	0
550–599	18	7	24	4	17	0	21	2
500–549	37	34	42	38	41	41	32	29
450–499	24	37	13	40	24	41	27	46
400–449	1	7	3	2	2	3	1	7
350–399	0	0	0	1	0	0	0	1
Number of schools	85	85	85	85	85	85	85	85
Median of school MCAT score means	523	497	531	499	520	498	522	487

TABLE 6

MEAN MCAT SCORES OF FIRST-TIME AND REPEAT APPLICANTS DURING THE PAST 3 YEARS

	First-time applicants						Repeat applicants					
Year	VA	QA	MS	Sc	No. taking MCAT	Total N	VA	QA	MS	Sc	No. taking MCAT	Total N
1956–57	502	500	505	490	11,812	12,749	477	472	486	469	3,059	3,168
1957–58	506	492	506	487	12,111	12,796	478	469	483	462	2,952	2,995
1958–59	505	507	501	493	11,727	12,260	478	470	481	465	2,879	2,910

average accepted applicant, who was born in March, 1936. In the Northeast, where applicants are on the average younger than elsewhere, the average successful applicant was born as late as July, 1936, and the average rejected applicant was born in April, 1935, only 5 months before the birth date of the average successful applicant from the West.

The average successful applicant from the West is nearly a year older than his counterpart from the Northeast, and the average rejected applicant from the West is 1½ years older than the corresponding rejected Northeasterner. Perhaps as a consequence of being an older group, the Western applicants find that age is more closely correlated with success in gaining admission than obtains elsewhere. The successful Western applicants are 22 months younger,

TABLE 7

RELATION BETWEEN THE OWNERSHIP OF MEDICAL SCHOOLS IN A STATE AND THE PERCENTAGE OF APPLICANTS FROM THAT STATE ACCEPTED TO SOME MEDICAL SCHOOL*

OWNERSHIP OF MEDICAL SCHOOLS IN THE STATE	DISTRIBUTION OF STATES ACCORDING TO PER CENT OF THEIR APPLICANTS ACCEPTED					TOTAL NO. OF STATES	MEDIAN PER CENT ACCEPTED
	25–45%	46–56%	57–62%	63–68%	69–78%		
Public	1	7	6	2	4	20	59
Public and private	0	6	4	2	2	14	58
Private	0	6	0	1	0	7	52
No medical school	3	3	3	1	0	10	53
All states	4	22	13	6	6	51	

* Numbers in the body of the table (except in the extreme right-hand column) are numbers of states. "States" here include the first 48 states, the District of Columbia, Puerto Rico, and an additional entry composed of Alaska, Hawaii, and U.S. possessions.

TABLE 8

MEAN BIRTH DATES OF ACCEPTED AND REJECTED APPLICANTS FROM FOUR U.S. REGIONS

REGION*	ACCEPTED APPLICANTS			REJECTED APPLICANTS		
	Mean birth date	Period during which the middle 68% of applicants were born	N†	Mean birth date	Period during which the middle 68% of applicants were born	N†
Northeast	July, 1936	Apr., 1935–Oct., 1937	2,455	Apr., 1935	Aug., 1933–Nov., 1936	1,802
South	Dec., 1935	June, 1934–May, 1937	2,365	July, 1934	Sept., 1932–May, 1936	1,637
North Central	Mar., 1936	Dec., 1934–June, 1937	2,368	Nov., 1934	Jan., 1933–Aug., 1936	1,262
West	Aug., 1935	Feb., 1934–Jan., 1937	932	Oct., 1933	Aug., 1931–Dec., 1935	847
Total	Mar., 1936	Oct., 1934–July, 1937	8,120	Sept., 1934	Nov., 1932–July, 1936	5,548

* Regions are composed as follows (applicants from Alaska, Hawaii, U.S. possessions, and foreign areas excluded):

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia

North Central: Indiana, Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

West: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

† Number of applicants for whom age data were available.

on the average, than their rejected colleagues.

Another way of viewing the relation between age of an applicant and his chances of gaining admission to medical school is to consider the percentage of older applicants accepted. Table 9 reports on those born before 1928, who would therefore have turned 30 before entering medical school with the 1958–59 first-year class. These figures support the observations already made in regard to age and likelihood of admission. In addition, they show that, although the percentage of older applicants admitted is particularly low in the Northeast (probably because of the larger number of competing younger applicants), the percentage is lowest of all among the Western applicants, which suggests that the admissions committees reviewing the applications of the Westerners actually place greater emphasis on age or age-correlated factors in selecting students than is true of other regions. (This relationship holds even after taking into account the smaller over-all acceptance ratio among Western applicants.)

TABLE 9

ACCEPTANCE RATIOS FOR APPLICANTS BORN BEFORE 1928 FROM FOUR U.S. REGIONS

	Region*			
	Northeast	South	North Central	West
Number† of older applicants accepted	44	82	48	33
Number† not accepted	86	124	75	90
Total	130	206	123	123
Per cent of older applicants accepted	33.8	39.8	39.0	26.8
Per cent accepted of all applicants	53.7	55.5	61.4	49.9
Number of all applicants:				
Accepted	2,457	2,389	2,381	934
Not accepted	2,117	1,916	1,496	938
Total	4,574	4,305	3,877	1,872

*† See footnotes to Table 8.

One of the traditionally much-studied measures used in medical student selection is the MCAT. In all past applicant studies since the late 1940's, the average MCAT scores of accepted and rejected applicants, of applicants filing different numbers of applications, and of repeat and first-time applicants, have been carefully followed. The patterns found in these studies have proved stable from year to year and may now be considered established. What has not been established until now concerning the use of MCAT scores is the diversity of practices from region to region (Table 10). Whereas the Western applicant is examined more critically in terms of age than his colleagues in other regions, his MCAT scores have relatively less influence upon the success of his application. Applicants from the Northeast, whose aptitude levels are high, are nevertheless more highly selected on the basis of their MCAT scores than are applicants in any other region. Southern applicants are selected on the basis of their MCAT level to nearly the same extent as Northeasterners; but, because the average MCAT level of Southern applicants is relatively low, the MCAT level required of Southerners for admission to medical school is lower than that in other regions.

It is clear from these data that the average applicant from any one region of the country differs in important respects from the average applicant in another region and faces correspondingly different selection hurdles. Specifically, age and measured ability factors are found to be differentially related to admission in the various regions of the country in that Northeastern and Southern residents who apply for entrance to medical schools are most stringently selected in terms of test performance, while

Western residents are most likely to be confronted with an age barrier. North Central admission practices are close to the national average with respect to the degree to which both age and test-score factors are taken into consideration.

AGE AND MCAT SCORE AS POSSIBLE DROP-OUT INDICATORS

Some insight into the over-all utility of combining age and MCAT score information in selection can be gained by viewing the relation between these variables and survival in medical school. Tables 11 and 12 show the per cent of 1956 first-year medical students in each age and MCAT bracket who had withdrawn by the end of the second year. They show, respectively, withdrawals resulting from academic failure and withdrawals for all other reasons.

Reading across the page on Tables 11 and 12 we see that at all age levels the incidence of withdrawals due to failure decreases with an increase in MCAT score level and that withdrawals for reasons other than failure are relatively unrelated to MCAT scores. In fact, at most age levels the highest percentages of drop-outs for reasons other than failure occur in the high-ability level groups.

Somewhat similar relations obtain between the drop-out rate and students' ages. The incidence of academic failure increases markedly as age increases, from 3 per cent of students born in 1936 or later, to 13 per cent of students born before 1927. On the other hand, dropping out for reasons other than academic failure appears relatively independent of age, varying from 4 per cent of the youngest group to 6 per cent of the oldest.

Close examination of the academic failure rates (Table 11) reveals that correlations with age and MCAT are not uniform at all age and MCAT levels. For instance, the academic failure rate for students born in 1935 and 1936 drops sharply when MCAT scores reach 460 and remains relatively stable above this level. As age increases and failure rate also rises, less discontinuity of the correlation with MCAT scores occurs. These findings suggest that the youngest of the medical students whose average verbal and quantitative MCAT scores are above about 459 have sufficient aptitude to compete with their peers on a purely intel-

TABLE 10

MEAN MCAT SCORES OF ACCEPTED AND NONACCEPTED APPLICANTS IN FOUR U.S. REGIONS

	Region*							
	Northeast		South		North Central		West	
	Accepted	Rejected	Accepted	Rejected	Accepted	Rejected	Accepted	Rejected
Verbal mean:	563	485	498	430	524	463	531	479
Difference between means of accepted and nonaccepted applicants:	78		68		61		52	
Quantitative mean:	547	467	507	430	543	468	537	478
Difference between means of accepted and nonaccepted applicants:	80		77		75		59	
Modern Society mean:	541	485	497	442	527	476	524	481
Difference between means of accepted and nonaccepted applicants:	56		55		51		43	
Science mean:	546	456	492	408	529	446	538	473
Difference between means of accepted and nonaccepted applicants:	90		84		83		65	
N	2,440	1,967	2,367	1,790	2,368	1,390	928	895

* See footnotes to Table 8.

TABLE 11

AGE AND MCAT CORRELATES OF 1956–57 FIRST-YEAR CLASS WITHDRAWALS RESULTING FROM ACADEMIC FAILURE

YEAR OF BIRTH	PER CENT WHO WITHDREW* MCAT score level† 260–409	410–459	460–509	510–559	560–609	610–659	660–759	No MCAT score	Total
1936 or later	7 (30)	11 (46)	2 (82)	2 (130)	2 (125)	2 (82)	0 (39)	17 (6)	3 (540)
1935	12 (139)	10 (242)	4 (380)	4 (516)	3 (414)	2 (264)	1 (73)	4 (52)	5 (2,080)
1934	10 (147)	8 (313)	7 (511)	4 (559)	3 (524)	1 (282)	3 (89)	9 (22)	5 (2,447)
1927–1933	17 (200)	12 (347)	10 (478)	8 (496)	6 (385)	7 (262)	8 (80)	4 (47)	9 (2,295)
1900–1926	17 (29)	13 (39)	17 (46)	12 (58)	12 (42)	6 (34)	9 (11)	11 (18)	13 (277)
All years	13 (545)	10 (987)	7 (1,497)	5 (1,759)	4 (1,490)	3 (924)	4 (292)	6 (145)	6 (7,639)

* In this table, "total number" (given in parentheses) refers to the total number of students in the specified age and MCAT category who entered medical school in 1956, including regular students who have continued in school as well as withdrawals of all kinds.

† For purposes of this table, the average of a student's MCAT Verbal and Quantitative Aptitude scores was considered his MCAT score.

TABLE 12

AGE AND MCAT CORRELATES OF 1956–57 FIRST-YEAR CLASS WITHDRAWALS RESULTING FROM REASONS OTHER THAN ACADEMIC FAILURE

YEAR OF BIRTH	PER CENT WHO WITHDREW* MCAT score level† 260–409	410–459	460–509	510–559	560–609	610–659	660–759	No MCAT score	Total
1936 or later	3 (30)	2 (46)	5 (82)	3 (130)	6 (125)	2 (82)	3 (39)	0 (6)	4 (540)
1935	4 (139)	5 (242)	4 (380)	5 (516)	5 (414)	8 (264)	8 (73)	4 (52)	5 (2,080)
1934	5 (147)	4 (313)	4 (511)	7 (559)	5 (524)	6 (282)	10 (89)	5 (22)	5 (2,447)
1927–1933	5 (200)	5 (347)	4 (478)	4 (496)	4 (385)	8 (262)	13 (80)	6 (47)	5 (2,295)
1900–1926	7 (29)	8 (39)	4 (46)	9 (58)	2 (42)	12 (34)	9 (11)	0 (18)	6 (277)
All years	5 (545)	5 (987)	4 (1,497)	5 (1,759)	5 (1,490)	7 (924)	9 (292)	4 (145)	5 (7,639)

* In this table, "total number" (given in parentheses) refers to the total number of students in the specified age and MCAT category who entered medical school in 1956, including regular students who have continued in school as well as withdrawals of all kinds.

† For purposes of this table, the average of a student's MCAT Verbal and Quantitative Aptitude scores was considered his MCAT score.

lectual basis. The older the student is, the higher is the MCAT average needed to assure that the student possesses the requisite intellectual aptitude for staying in medical school. Such a statement must, of course, be qualified by several considerations. First of all, the minimum aptitude level that provides a high probability of a student's intellectual adequacy will depend on the mean MCAT scores of the other students in his particular medical school. It has already been seen (Table 5) that school MCAT means vary widely. A second qualifying consideration is that the present analysis is concerned only with incidence of withdrawal from medical school and not with the quality of achievement of the students who will attain their M.D. degrees. The only competitive "success" for which intellectual adequacy is being measured here is student success in avoiding academic failure.

Tables 11 and 12 may be regarded as "expectancy tables" of academic withdrawals, that is, they give the odds that a particular student of known age and MCAT level will fail out of medical school or withdraw for other reasons. Although the tables are too general for use by a single school, since they are compilations of figures for all medical schools, they are a type of table that can be useful in the selection procedure. They have much in common with the so-called "indifference curve" tables used by economists. For example, Table 11 provides the information that students who were 21 when they entered medical school, and whose MCAT verbal and quantitative average scores are between 410 and 459, have an academic failure rate of 10 per cent, which is the same as the failure rate of students who were between 23 and 29 when they entered medical school and whose MCAT averages are between 460 and 509. If an admission committee had to choose between two such applicants, it would be a matter of "indifference" whom they accepted if they were interested primarily in minimizing academic failure among their students. When sufficient data are accumulated over a period of years to provide stable tabular entries, expectancy tables are useful as aids in decision-making.

THE UTILIZATION AND DEVELOPMENT OF AVAILABLE TALENT

In an era of concern for the efficient utilization and development of intellectual talent, it may be of interest to look further into the efficiency with which talent is developed in the area of premedical and medical study. Here, too, the data available for study are meager and limited. They are presented for whatever contribution they may make toward the profession's self-awareness.

For purposes of the present study, talent was simply defined as performance on the MCAT. Each applicant's MCAT score was taken as the average of his verbal and quantitative test scores. Just as the operational definition of "talent" was necessarily crude, so was the operational definition of "efficient." First, the number of accepted applicants with MCAT scores of less than 450 was tabulated. This group, 1384 in number, comprised nearly a fifth of all accepted applicants, and 387 of these had MCAT scores below 400. Secondly, the number of rejected applicants with MCAT scores of 600 or above was tabulated. There were 315 such applicants. About half of this group can be expected to reapply next year, and two out of three will succeed in gaining admission. Altogether then, of the 315 high-scoring applicants rejected this year, one out of three will eventually enter medical school.

For comparison purposes, it may be pointed out that MCAT scores of 600 and above are attained by only about the top 5 per cent of undergraduate college students (as indicated by a well established college aptitude test), whereas scores below 450 are attained by students ranking in the lower half of the undergraduate college student population.

Considered solely from the standpoint of utilization of intellectual capacities, a substantial amount of good talent, it ap-

pears, is being wasted, and opportunities for advanced education are being given to some individuals who would be more appropriately located in less intellectually demanding occupations. In the process of selection for admission to medical school, however, many factors other than aptitude test scores must be taken into account, and it is probable that the records of many high-scoring applicants who do not gain admission to a medical school contain evidence that the individuals are poor risks because of personal inadequacies. These individuals are the most regrettable waste, for identification of their difficulties and assistance toward correction at an earlier stage in their schooling would probably help to augment the ranks of effective contributors to all the professions.

According to the geographic distributions of abilities discussed earlier, it is likely that geographic restrictions on enrollment also play a relatively important role in effecting inefficiencies in the use of talent.

A rather different kind of loss is the type presented in Table 12—high-scoring admitted students who leave the field of medicine for reasons other than difficulty in doing the work. Some of these have perhaps been forced out by financial difficulty, family problems, illness, and death; but a substantial number each year lose interest in the profession they have already worked hard to enter. The role that greater flexibility in medical school curricula can play in preventing this kind of loss is being explored by many medical schools. Actually, medical schools are relatively very efficient in keeping the talent they attract. Their withdrawal rates are far lower than those in other disciplines, but not so low that further inroads upon them cannot reasonably be expected.

SUMMARY

Student interest in medical careers has been found low and falling throughout the country. The condition cannot be readily explained by other known social and economic trends, and hence bases for predicting trends in the immediate future are lacking. However, the outlook is not altogether pessimistic, since, in terms of measured abilities, at least, the quality of applicants for entrance to 1958–59 classes improved. Last year, it will be remembered, both numbers and quality decreased. Furthermore, with the number of college graduates steadily increasing, with local and national recruitment activities being developed, and with popular magazines according medicine a great deal of attention, an eventual reversal in the numerical trend seems likely. New candidates tested in 1958 (most of whom would be 1959–60 applicants) maintained the higher levels of test performance noted this year, suggesting that intellectual quality will be maintained.

The competitive position of the medical applicant varies considerably among geographical areas. The presence of publicly owned medical schools affects competition from one state to another, and between regions the patterns of abilities, average ages of applicants, and admission practices of medical schools vary. The degree to which age and measured ability factors are considered in selection has been shown to differ from one part of the country to another, and a mechanism for making efficient predictive use of these kinds of information has been demonstrated.

Some problems in the efficient utilization of talent available in medical applicant groups and additional problems in developing such talent adequately have been presented and discussed in the foregoing sections. Legislated geographical restrictions on medical school admissions policies, failure of pre-medical education to free creative potential from emotional impediments, and medical curricula insufficiently adaptable to individually differing students were all suggested as factors detracting from maximal cultivation of human resources in the group of physicians-to-be.

Ensuring a continued supply of able medical school entrants requires continual awareness of the many forces impinging on medical education from outside medicine,

as well as of the complex implications of change within. It is hoped that the objective of the present report, to draw attention to some of these forces, will stimulate increased examination of the issues by the separate medical schools through which these issues must ultimately be resolved.

APPENDIX

Tables A1 and A2 are traditional applicant study tables, reproduced here to round out the picture presented in preceding studies. There are no noteworthy deviations from the 1957–58 data, but readers who are concerned with school-by-school breakdowns of applicant behavior and with regional differences will find the tables of particular interest.

REFERENCES

1. ENGINEERING MANPOWER COMMISSION OF ENGINEERS JOINT COUNCIL. Trends in Freshman Engineering Enrollment, 1957–1958–1959.
2. KLINGER, E., and GEE, H. H. The Study of Applicants, 1957–58. J. M. Educ., **34**:424–35, 1959.

TABLE A1

NEW FIRST-YEAR ENTRANTS AND APPLICATION ACTIVITY OF APPLICANTS TO EACH SCHOOL

SCHOOL	ENTRANTS TO FIRST-YEAR CLASS	NO. APPLICANTS TO EACH SCHOOL			TOTAL APPLICATIONS BY EACH SCHOOL'S APPLICANTS	AV. NO. APPLICATIONS MADE BY EACH SCHOOL'S APPLICANTS
		Men	Women	Total		
Alabama	81	308	18	326	1,794	5.5
Albany	62	1,058	53	1,111	10,806	9.7
Arkansas	91	172	7	179	292	1.6
Baylor	83	918	43	961	7,004	7.3
Boston	71	1,102	81	1,183	11,495	9.7
Bowman Gray	54	821	39	860	6,879	8.0
Buffalo	82	666	28	694	6,960	10.0
California, L.A.	56	548	46	594	4,610	7.8
California, S.F.	101	572	45	617	4,555	7.4
Chicago Medical	69	981	18	999	10,059	10.1
Chicago, Univ. of	73	938	52	990	8,628	8.7
Cincinnati	90	963	34	997	8,031	8.1
Colorado	85	207	10	217	667	3.1
Columbia P & S	119	1,223	118	1,341	10,877	8.1
Cornell	85	1,061	108	1,169	10,207	8.7
Creighton	76	1,038	31	1,069	8,724	8.2
Dartmouth	24	321	3	324	3,013	9.3
Duke	79	888	32	920	7,654	8.3
Einstein (Yeshiva)	95	881	55	936	9,640	10.3
Emory	71	665	28	693	4,679	6.8
Florida	50	304	14	318	2,369	7.4
Georgetown	111	1,107	58	1,165	10,216	8.8
George Washington	101	1,209	62	1,271	11,485	9.0
Georgia	98	250	12	262	631	2.4
Hahnemann	107	323	17	340	2,325	6.8
Harvard	114	1,179	95	1,274	9,243	7.3
Howard	99	613	49	662	3,396	5.1
Illinois	199	630	31	661	2,734	4.1
Indiana	156	479	33	512	2,496	4.9
Iowa	115	195	4	199	462	2.3
Jefferson	175	1,599		1,599	11,206	7.0
Johns Hopkins	74	923	77	1,000	8,165	8.2
Kansas	94	286	20	306	1,750	5.7
Louisiana	120	256	19	275	673	2.4
Louisville	96	320	10	330	1,588	4.8
Loyola (Stritch)	88	711	23	734	5,005	6.8
Marquette	105	752	27	779	5,857	7.5
Maryland	98	325	12	337	2,707	8.0
Medical Evangelists	96	175	16	191	532	2.8
Meharry	65	335	27	362	1,512	4.2
Miami	70	225	12	237	1,276	5.4

TABLE A1—*Continued*

NEW FIRST-YEAR ENTRANTS AND APPLICATION ACTIVITY OF APPLICANTS TO EACH SCHOOL

SCHOOL	ENTRANTS TO FIRST-YEAR CLASS	NO. APPLICANTS TO EACH SCHOOL			TOTAL APPLICATIONS BY EACH SCHOOL'S APPLICANTS	AV. NO. APPLICATIONS MADE BY EACH SCHOOL'S APPLICANTS
		Men	Women	Total		
Michigan	193	561	42	603	2,465	4.1
Minnesota	137	286	21	307	1,158	3.8
Mississippi	74	243	9	252	1,056	4.2
Missouri	75	196	11	207	652	3.1
Nebraska	75	199	5	204	727	3.6
New York Medical	125	1,579	100	1,679	15,360	9.1
New York University	128	1,248	124	1,372	13,398	9.8
North Carolina	67	313	14	327	1,788	5.5
North Dakota	38	80	2	82	322	3.9
Northwestern	132	1,314	69	1,383	10,391	7.5
Ohio State	142	499	26	525	2,341	4.5
Oklahoma	97	238	12	250	1,147	4.6
Oregon	76	435	24	459	3,144	6.8
Pennsylvania	125	1,576	93	1,669	13,416	8.0
Pittsburgh	101	626	44	670	5,125	7.6
Puerto Rico	52	105	18	123	385	3.1
Rochester	69	1,035	49	1,084	10,642	9.8
St. Louis	116	1,109	39	1,148	8,864	7.7
Seton Hall	79	1,188	71	1,259	11,113	8.8
South Carolina	80	196	9	205	480	2.3
South Dakota	44	292	5	297	2,430	8.2
Southern California	68	642	45	687	5,726	8.3
Southwestern	99	480	25	505	1,620	3.2
Stanford	61	610	50	660	5,339	8.1
State U. N.Y., N.Y.C.	149	1,134	84	1,218	11,375	9.3
State U. N.Y., Syracuse	81	873	41	914	8,642	9.5
Temple	131	1,182	62	1,244	9,890	8.0
Tennessee	200	731	28	759	2,371	3.1
Texas	137	509	25	534	1,739	3.3
Tufts	114	942	59	1,001	9,606	9.6
Tulane	127	1,041	44	1,085	7,455	6.9
Utah	53	309	3	312	1,879	6.0
Vanderbilt	52	679	24	703	6,205	8.8
Vermont	51	303	17	320	2,631	8.2
Virginia, Medical Col.	84	384	21	405	2,387	5.9
Virginia, Univ. of	76	535	30	565	4,017	7.1
Washington, St. Louis	86	1,353	61	1,414	10,767	7.6
Washington, Univ. of	75	400	23	423	2,681	6.3
Wayne State	124	294	20	314	1,117	3.6
Western Reserve	77	1,272	81	1,353	10,725	7.9
West Virginia	41	109	5	114	351	3.1
Wisconsin	100	192	17	209	698	3.3
Woman's Medical	51		207	207	1,202	5.8
Yale	80	984	73	1,057	8,957	8.5
Total	7,920	55,803	3,299	59,102*		3.9

* Note that this figure is the total number of applications made by 15,170 individuals.

TABLE A2

Acceptance Data on Applicants by State

State	Applicants receiving one or more acceptances				Applicants not accepted			Total no. applicants	Total no. applications
	Men	Women	Total	Per cent	Men	Women	Total		
Alabama	105	9	114	52	99	5	104	218	502
Arizona	42	3	45	58	30	3	33	78	370
Arkansas	110	3	113	61	69	3	72	185	290
California	428	40	468	46	508	32	540	1,008	5,916
Colorado	101	3	104	60	64	4	68	172	369
Connecticut	90	9	99	52	90	2	92	191	1,301
Delaware	19	1	20	65	9	2	11	31	138
District of Columbia	53	8	61	46	60	11	71	132	402
Florida	170	11	181	58	125	7	132	313	1,060
Georgia	171	4	175	54	142	10	152	327	775
Idaho	28	1	29	60	19		19	48	196
Illinois	414	16	430	58	288	23	311	741	2,485
Indiana	183	12	195	54	150	14	164	359	791
Iowa	148	6	154	71	60	3	63	217	439
Kansas	94	3	97	62	51	8	59	156	359
Kentucky	131	3	134	54	109	3	112	246	605
Louisiana	157	11	168	59	106	9	115	283	583
Maine	14	2	16	59	9	2	11	27	131
Maryland	128	5	133	55	102	9	111	244	927
Massachusetts	210	16	226	49	211	23	234	460	2,562
Michigan	335	24	359	62	200	20	220	579	1,688
Minnesota	160	11	171	69	72	5	77	248	568
Mississippi	107	5	112	59	72	6	78	190	377
Missouri	161	10	171	64	92	6	98	269	795
Montana	25	1	26	48	26	2	28	54	207
Nebraska	105	1	106	64	59	1	60	166	324
Nevada	11	1	12	55	10		10	22	101
New Hampshire	18	3	21	66	10	1	11	32	129
New Jersey	302	17	319	54	256	19	275	594	3,642
New Mexico	17	2	19	56	15		15	34	156
New York	1,036	90	1,126	54	881	67	948	2,074	13,786
North Carolina	143	7	150	48	152	12	164	314	855
North Dakota	34	1	35	66	18		18	53	83
Ohio	418	26	444	57	325	15	340	784	3,103
Oklahoma	129	2	131	67	59	6	65	196	396
Oregon	77	3	80	54	66	3	69	149	462
Pennsylvania	572	44	616	55	476	28	504	1,120	4,293
Rhode Island	22		22	37	37	1	38	60	396
South Carolina	98	8	106	48	112	4	116	222	490
South Dakota	39		39	78	10	1	11	50	101
Tennessee	209	5	214	69	93	4	97	311	502
Texas	327	15	342	52	302	17	319	661	1,960
Utah	44	1	45	41	64		64	109	333
Vermont	11	1	12	71	5		5	17	39
Virginia	158	10	168	59	110	9	119	287	708
Washington	93	3	96	55	76	4	80	176	565
West Virginia	64	3	67	47	73	4	77	144	450
Wisconsin	168	12	180	71	67	8	75	255	606
Wyoming	10		10	45	12		12	22	96
Puerto Rico	57	6	63	54	39	14	53	116	288
U.S. Possessions	27	4	31	44	36	3	39	70	308
Canada	10		10	16	48	4	52	62	175
Foreign	76	7	83	36	136	13	149	232	782
Not stated	17	1	18	29	41	3	44	62	137
Total	7,876	490	8,366	55	6,351	453	6,804	15,170	59,102

A Comparative Evaluation of Medical Schools

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One medical school may be—and frequently is—compared with another from many and varied points of view: the popularity of the school as judged by the number of applicants for admission; the school's ability to attract prominent faculty members; the success of students in obtaining the most sought after internships and residency appointments; the size of the budget and the number of research grants; or the number of graduates who become chiefs of service or heads of departments. A somewhat different approach lies in the use of objective, external examinations, which, when applied to groups of students, provide a basis for valid comparative evaluations of medical schools.

The purpose of this paper is therefore, first to describe the way in which the examinations of the National Board of Medical examiners serve as an instrument to measure medical knowledge and provide, thereby, factual information that permits a medical school to test the effectiveness of its teaching, subject by subject, in comparison with that of other schools. Secondly, we propose to discuss the validity and meaning of these comparisons as a result of a study of correlations between Medical College Admission Test scores, National Board grades, and the judgment of medical school faculties in appraising their own students.

The nature of the measuring instrument.—The written examinations of Part I and Part II of the National Board are all of the objective, multiple-choice type.[1] The examination for each subject consists of a large number of questions (approximately 180–220), the number having been carefully adjusted to the time allowance for that particular subject (generally 2–3 hours).

Many different types of questions have been devised to test not only the student's knowledge, but also the subtler qualities of discrimination, judgment, and reasoning. Certain types of questions call for recognition of the similarity or dissimilarity of diseases, drugs, physiologic or pathologic processes. Other questions evaluate the student's judgment as to cause and effect, or the lack of causal relationships. Case histories are used to simulate the experience of a physician confronted with a diagnostic problem; a series of questions then determines the understanding of related aspects of the case, such as associated laboratory findings, treatment, complications, and prognosis. Each question has only one correct response among a number of possible choices, most often one correct response out of five choices, although the ratio may be somewhat less or considerably more.

Each written examination is developed by a separate committee made up of six members, including department heads, teachers, and clinicians with recognized prominence in the subject of the test. For the eleven major subjects included in these examinations, there are eleven test committees, with a total of 69 members of medical school faculties. These committees have wide ge-

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[1] Part I consists of separate tests in: anatomy, physiology, biochemistry, pathology, microbiology, and pharmacology. Part II includes: medicine, surgery, obstetrics and gynecology; public health and preventive medicine; and pediatrics.

ographic distribution; each committee member serves for a term of 4 years. In the past 5 years, about 180 individuals have served on the committees from a total of 65 medical schools. This wide representation with rotating membership has helped to insure that the examinations are broad in scope and reflect up-to-date medical teaching throughout the country.

Approximately a year goes into the preparation of each examination. Each committee member thoughtfully and studiously writes test questions in accordance with the requirements of the particular subject. These questions are submitted for critical review by the other members of the committee. Then, at a 2-day meeting, each individual item is either accepted, revised, or rejected by the committee itself. Hence, the examination contains only material that has been thoroughly worked over and agreed upon as appropriate, free from ambiguity and representative not only of important aspects of a subject, but also of high standards of medical education.

The scoring of these examinations is a function of the distribution curve based on the scores of all students taking the examination. From the number of questions answered correctly, a linear conversion is made, with 75 established as the minimum passing grade and 88 or above signifying honor performance.

Comparative measurements of medical school classes.—When an impartial, objective, extramural examination is used at the same time for all students in a number of different medical schools, the performance of the students in one school may be compared directly with that of the students in other schools. At the present time, a majority of all medical students in the United States take National Board examinations during the course of their medical education, either as a requirement of their medical schools or by individual choice as a step toward qualification for a license. For the purposes of a comparative analysis, however, it becomes important to include in the analysis only those medical school classes in which all or virtually all students have taken the examination. When only a portion of a medical school class takes these examinations on a voluntary basis, it is probable that a number of the less confident or weaker students are not included among the examinees. When the examinations are taken by all or virtually all the students in the class, the bias of self-selection is eliminated.

TABLE 1

LIST OF 30 MEDICAL SCHOOLS WITH 90–100 PER CENT PARTICIPATION IN NATIONAL BOARD EXAMINATIONS; PART II, APRIL, 1959

Medical College of Alabama
Albany Medical College of Union University
Albert Einstein College of Medicine of Yeshiva University
Boston University School of Medicine
University of Buffalo School of Medicine
Chicago Medical College
George Washington University School of Medicine
Harvard University Medical School
University of Illinois College of Medicine
State University of Iowa College of Medicine
University of Kansas School of Medicine
University of Maryland School of Medicine
College of Medical Evangelists School of Medicine
University of Miami School of Medicine
University of Michigan Medical School
University of Nebraska College of Medicine
New York Medical College
University of North Carolina School of Medicine
University of Oregon Medical School
University of Pennsylvania School of Medicine
University of Rochester School of Medicine
Saint Louis University School of Medicine
University of Southern California School of Medicine
Stanford University School of Medicine
University of Texas Medical Branch
Tufts University School of Medicine
University of Utah College of Medicine
University of Vermont College of Medicine
Western Reserve University School of Medicine
Yale University School of Medicine

There are currently 30 schools in which National Board examinations are taken by all students. These schools are listed in the accompanying table (Table 1). Those familiar with medical education in the United States will recognize a fair representation in this list; large schools and small schools, private schools and state schools, with wide geographic distribution.

To illustrate the type of information which thus becomes available for purpose

of evaluation and comparison, we have selected the results of the examination in surgery for April, 1959. In Table 2, the mean score, per cent honor, and per cent failure are given separately for each school. The schools are listed in rank order determined by the mean score. Each school is identified only by a randomly assigned confidential code number.

TABLE 2

SUMMARY OF RESULTS OF EXAMINATION IN SURGERY IN 30 MEDICAL SCHOOLS: PART II, APRIL, 1959

School code	Mean	Per cent honor	Per cent fail
28	85.26	35.6	.0
40	84.92	31.5	.8
26	84.27	27.9	2.5
39	84.04	23.5	.0
21	83.68	21.2	1.5
1	83.35	25.0	1.1
33	82.78	20.0	2.9
31	82.69	16.0	1.9
24	82.68	10.6	.0
10	82.24	17.2	1.4
12	82.09	11.0	4.0
18	82.06	11.1	2.8
20	82.00	13.6	1.5
15	81.61	12.7	5.1
38	81.44	8.1	3.8
3	81.32	6.8	4.9
16	81.13	16.1	10.7
8	80.96	13.9	5.6
32	80.90	10.0	3.3
11	80.87	11.3	3.2
2	80.68	10.2	10.1
4	80.55	10.6	3.0
37	80.15	9.5	8.6
30	80.04	6.0	6.0
36	79.80	11.9	11.9
25	79.45	6.3	14.1
5	79.19	5.6	18.1
29	78.68	.0	14.0
35	78.39	2.4	18.9
6	76.07	1.5	31.3

The wide disparities in student performance from school to school immediately become very apparent. The range in the mean score for the test varies from 76.07 to 85.26. In the top ranking school, 35.6 per cent of the students obtained an honor grade (88 or above), and there were no failures (grade less than 75). By way of contrast, in the school at the bottom of the list, only 1.5 per cent of the students obtained honor grades, and 31.3 per cent failed.

It is also interesting to note that the per cent honor and the per cent failure show considerable variation in comparison with the mean scores, reflecting thereby the difference in characteristics found among medical school classes. For example, although school 30 and school 36 have approximately the same mean score for their student class, school 30 has about half as many honor students and also half as many failures. Thus it appears that the students in school 30 are all relatively uniform and equal in their knowledge of surgery, whereas school 36 shows less uniformity with a wider spread between the top ranking students and the low ranking students.

When these data are tabulated for each subject and compiled for each school separately, it then becomes possible to show a profile of the performance of the student class for the five clinical subjects of Part II, and similarly for the six basic science subjects of Part I. In Chart 1, we have shown such a profile for three schools designated as A, B, and C. The shaded area in this chart shows the range of performance for the 30 medical school classes. For example, the range in medicine was from a high mean score of 84.98 to a low mean score of 77.43. School A shows performance of uniformly high calibre in all subjects, while School C shows uniformly low performance. School B shows a variable performance of its students, with high scores in obstetrics and gynecology and relatively low scores in medicine and in public health.

Detailed measurement of student performance in categories of subject matter.—A more detailed profile of the students' knowledge of the major subjects is possible from further, and rather extensive statistical analysis. For each examination, the committee responsible for that test subdivides the subject matter into approximately twelve subdivisions or "categories." Each question is assigned to the one category to which it is principally related. A mean score can then be computed for each category for each school. These mean category scores form the basis on which a student class can be compared with other classes and with the

total group in their knowledge of the several categories of the separate subjects.

About 6 years ago, a study of this nature was done with the cooperation of the Educational Testing Service.[2] This type of analysis aroused so much interest and led to so many requests for a repetition of the project that, after an interval of 6 years, it has been repeated, this time by the staff of the National Board.

Chart 2 demonstrates the variation in the entire group of students in 33 medical schools in answering the questions in each of the nine categories comprising the test in surgery. As shown here, the students answered correctly on the average 74 per cent of the questions dealing with surgery of the cardiovascular system. They had far less success in answering the questions dealing with the musculoskeletal system (52 per cent correct responses).

It should be noted that these comparisons are based on groups of questions, each group containing between 20 and 40 questions, with the single exception of the category of pre-operative and post-operative care which included eleven items.

In interpreting the data in this chart, one question immediately arises: Are the

[2] John P. Hubbard and John T. Cowles, A Comparative Study of Student Performance in Medical Schools Using National Board Examinations, J. M. Educ., 29:27–37, 1954.

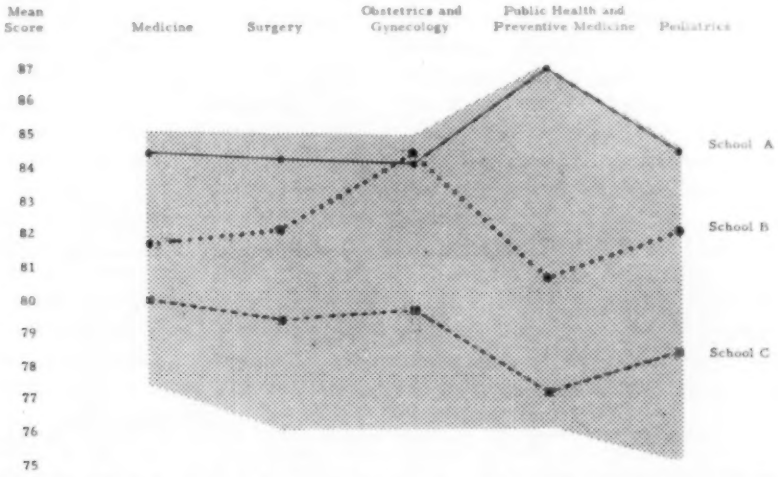

CHART 1.—Variability of performance of medical school classes in subjects of Part II, April, 1959 (shaded area indicates range of scores).

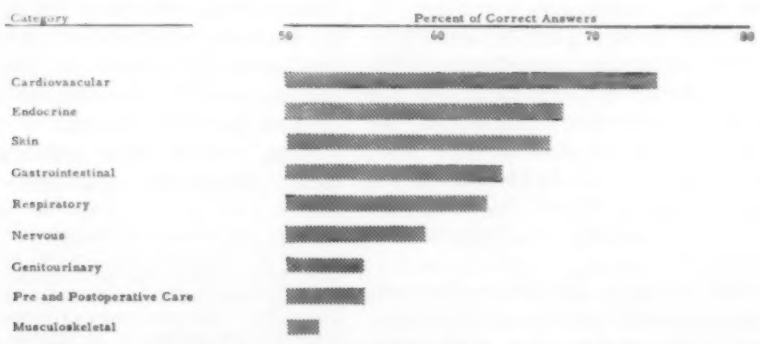

CHART 2.—Per cent correct answers by categories of subject matter for the June, 1958, surgery examination (sample of 2883 students from 33 schools).

differences in average per cent correct responses for the several categories a real reflection of student knowledge in a particular category, or are the results merely due to more difficult items in one category than in another? This question cannot be answered with statistical accuracy from our data. However, a general assumption can be made. The test committees, as they initially write the questions and as they later prepare the total test, seek to maintain consistency in the difficulty of questions irrespective of the categories to which the questions may be assigned. Therefore, although no particular importance should be attached to the specific percentage differences in the students' ability to handle one category in comparison with another, nevertheless these disparities do indicate a relative measurement of the knowledge of the individual categories of subject matter in the total group of students in all the schools in this study.

When the category scores are computed and tabulated separately for each medical school class, one student class may again be compared directly with another and with the range of performance in the total group. This procedure graphically demonstrates (see Chart 3) whether the students of a certain school are consistently high, low, or average in performance, or whether their performance shows fluctuations, high in some categories and low in others.[3]

Thus, the strengths and weaknesses of each student group are reflected by its profile in the individual subjects. However, a word of caution is indicated in interpreting these profiles. The performance in one category of one test does not necessarily reflect the teaching content or the quality of the medical school department responsible for that particular subject. For example, in the surgery examination, the students' knowledge of the cardiovascular system will obviously include information acquired in earlier courses such as anatomy, pathology,

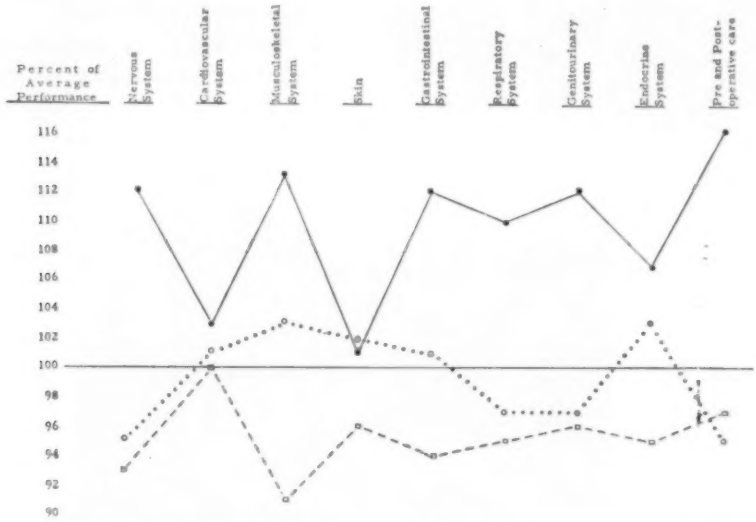

CHART 3.—Variability of performance of three medical school classes in each of the sub-categories of the surgery examination June, 1958, in terms of actual performance as a per cent of the average performance of 2883 students from 33 schools.

[3] For each of the schools included in this study, a detailed report has been submitted to the Dean showing a profile of class performance by categories of subject matter in each of the major subjects, in comparison with the range of performance of all medical school classes of the schools in this study. The confidential nature of the performance of the individual schools is strictly maintained.

and physiology as well as the experience he has gained in other clinical subjects.

However, if one bears in mind the limitations inherent in this type of study, it does become possible to provide a realistic and detailed basis upon which a medical school department may judge its own teaching efforts.

Comparability of National Board grades and Medical School grades.—Up to this point in this presentation, we have been accepting without question the results of National Board examinations as an accurate and valid measurement of a student's knowledge and his ability to apply that knowledge to the problem in hand. Let us now turn to a critical appraisal of the instrument itself, that is to say, the validity of the examinations, defining validity as the degree to which a test accurately measures that which we are seeking to measure and distinguishes between those who are well qualified and those who are not well qualified in the subject of the test.

Probably the best evaluation of a student class is that which is made by the faculty itself. Wide variations will appear in the ability of individual students to master a particular subject; but at the end of a year, when departmental grades or ratings are averaged, considerable reliance can be placed upon the faculty's judgment in classifying the students in at least broad categories such as top third, middle third, and bottom third. When the performance of each of the traditional 4 years is averaged at the end of the fourth year, an index is then obtained of the cumulative judgment of the faculty over the entire 4-year period. Included in this index are all the scores derived from written and oral examinations, laboratory exercises, "quiz sessions," grades for clinical clerkships, and all the other factors which comprise a student's grade and which may have been weighted more or less heavily for major subjects in comparison with minor subjects. Unquestionably, this cumulative 4-year faculty appraisal of its students has validity in distinguishing between the excellent students, the average students, and the poor students, or in dividing the class into top third, middle third, and bottom third.

This faculty evaluation does not, however, provide a basis for comparisons between one school and another. A grade of "A" may have very different meaning from school to school, and the requirement for promotion from one class to the next may vary markedly. If, however, it can be shown that the rank order of a student class based upon grades of National Board examinations correlates closely with the rank order based upon the cumulative judgment of the students by their own faculty, then it follows that we have an evaluation that appears to be measuring students much as their own faculty has measured them. Furthermore, this evaluation provides an objective and impartial numerical grading system that can be expressed in statistical terms such as mean score and standard deviation, that has consistent meaning, and that can be used for valid interschool comparisons.

The extent to which the Part II examination grades agree with the judgment of the medical school faculty in ranking their own students has been determined in a cooperative study undertaken jointly by the National Board of Medical Examiners and the Research Division of the Association of American Medical Colleges. For a group of seventeen medical schools each of which used National Board examinations for the entire class and provided a ranking of its own students, a coefficient of correlation between the grades obtained on the Part II examinations of the National Board and the ranking of the students by their own faculties was computed. For this purpose, we have used, on the one hand, the average Part II score obtained by averaging the scores for the five subjects of this Part (medicine, surgery, pediatrics, public health and preventive medicine, and obstetrics-gynecology). On the other hand, we have taken the cumulative 4-year rankings of the medical students obtained by averaging the faculty ranking recorded for the students

at the end of each of the 4 years. As shown in Table 3, a very high correlation does indeed exist between the faculty ranking and the ranking by Part II of the National Board examinations, demonstrating thereby in convincing fashion that the results of our Part II examinations do in fact correspond extraordinarily closely with the 4-year cumulative appraisal of the students by their own faculty. In our opinion, no more convincing demonstration could be made of the validity of National Board examinations.

TABLE 3

CORRELATIONS BETWEEN NATIONAL BOARD, PART II, SCORES AND THE FOUR-YEAR CUMULATIVE AVERAGES OF SCHOOL GRADES FROM SIXTEEN SCHOOLS

School	Coefficient of correlation
A	86
B	80
C	79
D	79
E	76
F	74
G	72
H	70
I	68
J	68
K	68
L	64
M	64
N	61
O	61
P	57

Correlation between MCAT scores and National Board grades.—A medical school may be judged not only on the excellence of its end product but also in relation to the raw material that it takes in. When correlations are made between Medical College Admission Tests, serving as a measurement of the raw material, and Part II grades of National Board examinations, serving as a measurement of the end product, then we may see how good a job a medical school is doing in terms of the quality of its student body.

Data for four medical schools are sufficient to illustrate this point. In Chart 3, the average score for the science achievement part of the MCAT is plotted on the left side; the average Part II grades for these same students, 5 years later, are plotted

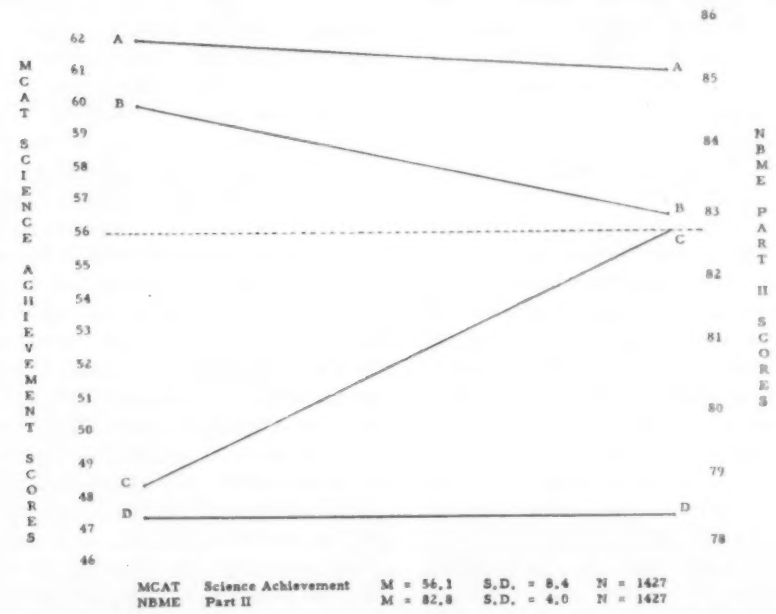

CHART 4.—Relation between MCAT science achievement mean scores and NBME, Part II, mean scores for four selected schools.

on the right margin. In this analysis the science achievement test is used since, from additional studies of these data, it is clear that this portion of the Medical College Admission Tests correlated higher with medical school performance and with National Board grades than the other three sections of the Medical College Admission Test.

As indicated here, school "A," which is highly selective in the admission of its students, as judged by the MCAT scores, turns out a class of students which stands near the top of the list on Part II examinations. Conversely, the students entering school "D" ranked very low on the MCAT and were also ranked very low by Part II examinations. Schools "A" and "D" are typical of the expected relationship in this type of study, that is, high in-put tends to yield high out-put and low in-put tends to yield low out-put. However, School "B," also highly selective in its admission policy, had a graduating class which was barely above average on Part II examinations, while School "C," a small state university school with little capacity for selectivity, showed a marked capacity to elevate the quality of its students.

From such data the question can be asked which school is doing the better job in teaching its students: School "B" or School "C"? Or even School "A" or School "C"?

We do not presume to answer these questions. Nor do we consider it fair or proper to judge medical schools and their teaching solely on the basis of examination results. Any examination is a limited and incomplete evaluation of a student. No matter how good a test may be thought to be, no matter how great a degree of statistical significance is attached to its validity, it is an index of only certain characteristics, measured at one point in time and influenced by variable factors. Normative test data of the kind developed in this study require, for their full interpretation, knowledge of the characteristics of each student group and of the total group of students with which its performance is being compared.

Nevertheless, if these limitations are kept in mind, the results of these extramural examinations, as currently administered by the National Board of Medical Examiners, do provide valid and reliable information which reflects not only the competence of the students but also the effectiveness of their medical schools.

ACKNOWLEDGMENTS

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A Teaching Program Based on Comprehensive Care for the Family*

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INTRODUCTION

Modern civilization has come to recognize the family as the basic social unit of our culture. From the beginning of the history of man to the present, the family has been the strongest and most enduring of institutions. The family is a biological unit as well as a social unit, and as such it may fall prey to diseases of a wide variety, some of hereditary character, some which stem from common ecological influences shared by family members, some spread by intimate contact within the family circle, and still others of either primarily physical or emotional nature for which the etiology and mode of spread are not known. Perhaps nothing threatens the family's integrity more than illness in one or more of its members. This is one of the principal reasons why the family is the ideal unit in which to teach the practice of preventive medicine at the clinical level.

The concept of the family as the unit for teaching gains support from the philosophy of modern-day clinical epidemiologists. Paul (2) observes, "in spite of the gradual disappearance from the medical scene of the 'family doctor,' the family remains a fundamental unit of importance for any physician who attempts to cultivate the clinical epidemiological approach. He can begin, for instance, by regarding the family of his patient as a domiciliary unit which can be considered in the same light as an individual case. It deserves a history, an examination, a diagnosis, and a number of other measurements which the clinician, or others familiar with families, can make." Francis (1) has written, "the understanding of disease as a problem interpretable in terms of the community has been greatly advanced by the combination of ecologic, clinical and laboratory investigations. And it is for this reason that I should like to re-establish the modern physician as the family doctor, employing the available evidence of the role of the family as a unit of disease."

Custom, administrative requirements, and specialization in medical schools, hospitals, and in medical practice have combined to ignore the social and biological unity of the family. In the customary routine of accepted hospital or clinic medical practice the family is fragmented into its individual members who are further compartmentalized into separate organs and systems and segregated according to age and sex. There is danger that medical students may develop a narrow central vision which might give them an incomplete and misleading picture of the medical problems of patients and their families. The emphasis in the teaching and practice of modern clinical medicine is on the diagnosis and treatment of disease, not on its prevention. To remedy some of these defects a family

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health program has been organized at Vanderbilt University School of Medicine, as a teaching demonstration for students, beginning in their first year and extending through all 4 years, of comprehensive medical and socio-economic care for the family, emphasizing especially preventive medicine in its broadest sense, directed not only toward promoting physical health but also toward emotional and social well-being.

Teaching of the social aspects of medicine at Vanderbilt was introduced in the fall of 1951. The first 3 years of experience was described by Youmans and Russell in 1954 (3). The present paper is in the nature of a progress report.

OBJECTIVES

The objectives of the Family Clinic teaching program can be set down best in outline form. They are:

1. To demonstrate in practice the desirability and feasibility of dealing with the family as a medical and social unit.
2. To introduce the concept of preventive medicine and comprehensive care, including social and environmental medicine, to first- and second-year students.
3. To extend this teaching to the third- and fourth-year curriculum.
4. To introduce domiciliary care in the teaching of fourth-year medical students for the purpose of providing an experience with illnesses not normally encountered on the wards or in the out-patient department, and to give the student an opportunity to observe the patient's socio-economic environment in relation to his illness.
5. To teach preventive medicine at the clinical level.
6. To utilize medical and epidemiologic data from the families for research purposes.

PLAN OF TEACHING

The medical student throughout his 4-year course plays an important part in the Family Clinic activities. His preparation for this role follows the classic concept of study of the basic sciences of preventive medicine (epidemiology and biostatistics) in the preclinical years, and their clinical application in the third and fourth years.

Preclinical Teaching

First year.—The first-year course in Social and Environmental Medicine given by the professor of psychiatry explores the social and emotional development of the normal infant in relation to other members of the family.

After preliminary instruction by clinicians in seminars designed to teach him interviewing techniques and how to develop skill in establishing a student-patient relationship, the first-year student is assigned a "normal" family that belongs to the Family Clinic. During his preclinical years he acts as an observer and advisor to this family and is its liaison with the Clinic. He makes periodic visits to the home, observes the physical, social and economic environment in which the family lives, and studies the intrafamilial relationships. His observations are embodied in written reports that are kept in the family folder on file in the Family Clinic. He also reports to and discusses his observations periodically with a faculty advisor and a social service advisor. The information he gathers and records forms an essential part of the family docket and, together with the medical data, provides a total, comprehensive picture of the family as a social and biological unit.

Second year.—During the fall quarter, the second-year student is given a lecture course in epidemiology, and a lecture and laboratory course in biostatistics. At the same time, he continues to visit his assigned family periodically, but now, although he reports to his faculty advisor on a regularly scheduled basis, he meets with his social service advisor only as a specific consultative need arises.

During the first year the student studied and observed the influence on health and disease of one of the factors in epidemiology, the environment. Now, during the second year, he is taught the proper perspective of the environment in the multiple causation of disease, and Agent and Host factors are presented at a time when the student is

also studying pathology and microbiology. General principles of epidemiology are discussed and applied to a variety of disease processes.

The course in biostatistics is designed to acquaint the student with the elements of statistical reasoning as applied to medical problems, and includes methodology and evaluation.

In the spring quarter, second-year students are shown the practical application of the principles and methods of epidemiology and statistics in the study of two chronic diseases, tuberculosis and rheumatic fever. In this course the natural history of these diseases is discussed, epidemiologic data are analyzed, and cases are presented demonstrating the many factors which influence the development, course, and prognosis. This course is given at a time when the student is being introduced to physical and laboratory diagnosis in preparation for his clinical studies.

Clinical Teaching

Third- and fourth-year students are assigned to duty in the Family Clinic. Their function and activities in the Clinic are described below.

PLAN OF OPERATION OF FAMILY CLINIC

The clinic is so organized that many, if not all, of the examinations and services required by any family can be done within its confines. From time to time it is necessary to refer patients to specialty clinics for either diagnostic procedures or treatment. If the patient is to be referred to another clinic, e.g., surgery, the third- or fourth-year student, with the help of the clinic secretary, arranges the appointment. If a problem arises and the student's medical consultant deems it necessary for a member of the family to be seen between scheduled appointments in the clinic, the first- or second-year student following the family arranges the appointment with the clinic secretary. Patients referred to other clinics for definitive treatment or special study return to Family Clinic after the studies or treatment have been completed.

As soon as possible after a family joins the clinic each member is given a complete base-line evaluation, which includes (*a*) complete history and physical examination, (*b*) a battery of screening laboratory examinations, (*c*) Papanicolaou cervical smear examination for married females, (*d*) brief psychological screening examinations, (*e*) dietary histories as indicated, and (*f*) immunizations. The clinic meets one afternoon a week. The fee schedule for members of the Family Clinic is the same as for the other clinics. In the event a family cannot afford to pay the clinic fee, the Family Clinic is prepared to make arrangements in selected cases.

SELECTION OF FAMILIES

The core of the Family Clinic is the families which have been assigned to the first- and second-year students. After the student has followed the family for 2 years it is reassigned to another first-year student, provided the consultants and the student believe it is a suitable family to be kept in Family Clinic. The families are selected by a social worker and physician primarily from the well-baby clinic but occasionally from the pre-natal clinic and other outpatient clinics. The criteria for selection of families are:

1. Fairly young parents with a young, growing family with fewer than six children.
2. Absence of problems of chronic or terminal illness or of overwhelming medical or socio-economic problems.
3. Accessibility, for convenience of students; in general, families living very far outside the city limits are not accepted.
4. A regular source of income. Indigent or private patients are not accepted for Family Clinic.
5. Willingness of the family to cooperate and attend the clinic.

The attempt is made to keep the clinic roster of families at a number which will allow one family for each student (usually about 104 students are enrolled in the first and second years). Obtaining families is a never-ending process, because of loss through moving, failure to cooperate, or

discharge as unsuitable for the needs of the program.

PERSONNEL

The Family Clinic has a staff consisting of pediatricians, internists, a psychologist, a social case worker, a public health nurse, a dietician, a psychiatric consultant, an obstetrical and gynecologic consultant, a secretary, and a clerk.

1. Director—Professor of Preventive Medicine and Public Health.

2. Assistant Directors—Professor of Epidemiology and Associate Professor of Pediatrics.

3. Policy Consultants—The Dean of the School of Medicine, Professor of Pediatrics, and Professor of Obstetrics and Gynecology.

4. Clinical consultants representing the specialties of medicine and pediatrics. A psychiatrist and obstetrician and gynecologist are available on call for consultation.

5. Social Service Consultant—A social worker serves as consultant to the clinic and participates in the Family Clinic seminars. Her service is in connection with social problems that are inappropriate or too complex for the medical student.

6. Pediatric House Staff—Two assistant residents are assigned regularly to the clinic by the Department of Pediatrics.

7. Public Health Nurse—She visits each family as soon as it joins the clinic and thereafter at yearly intervals or more often if her services are needed. Extensive nursing care in the home can be provided by established agencies in the community when necessary. In addition to her regular duties the public health nurse helps to plan and coordinate these nursing services.

8. Nurses and nurses' aides assist in the usual nursing services in the clinic.

9. Dietician

10. Psychologist—He does a general psychological evaluation of each adult and child over age 6.

11. Secretary

12. Clerk

FIRST- AND SECOND-YEAR STUDENT ASSIGNMENT IN FAMILY CLINIC

Whenever an appointment is made for a first- or second-year student's family to attend the clinic the student is notified well in advance by the clinic secretary that he will be expected to attend the clinic and observe the procedures and services rendered to his family. When his family is presented at seminar the student is required to be present and relate the pertinent social and environmental data. First- and second-year students are assigned to attend the seminar each week so that each student will have the opportunity of seeing the clinic and seminar in operation before his third year. Continuation of the teaching program into the third and fourth years is described below.

THIRD- AND FOURTH-YEAR STUDENT ASSIGNMENT AND DUTIES

Fourth-year students during their assignment to pediatrics and third-year students during their assignment to obstetrics serve in the Family Clinic. A third-year student works with a fourth-year student. Working in pairs, they are required to do a complete work-up on all new patients or on patients returning for periodic check-ups, after which they are checked by a member of the staff. Patients who are ill or are receiving well-baby care are handled in a manner similar to that in other out-patient clinics. In reporting his findings to the clinician, the student is expected to know the pertinent social and environmental data as well as the medical facts of his patient, and in outlining a plan for the patient he is expected to take these factors into consideration. In prescribing for patients, preventive medicine is emphasized. At the present time there is no other place in the curriculum where the family can be observed as a unit.

FAMILY CLINIC SEMINARS

At the beginning of each clinic a 1-hour seminar is held which the entire clinic staff attends. Attendance is required of all students during their period of assignment to

the clinic, and in addition one or two first- and second-year students attend each week. The seminars conducted by the director or one of his assitants have as their purpose to present, in as much detail as possible, all the medical, environmental, and socio-economic data on a family selected for discussion, following which recommendations for preventive and therapeutic measures are outlined. The first- or second-year student whose family is being presented is required to attend (if regular class schedule permits) and present a brief summary of the socio-economic and environmental characteristics of his family plus any other data he deems important, based on his observations of the family during his home visits. Next, short summaries of the medical status of each member of the family are presented, usually by the leader of the seminar, but, when time allows for previous review, by the student who has examined the patient or his records. Following presentation of the medical findings, the social worker outlines the social and economic problems of the family if she has rendered service. If the public health nurse has additional pertinent data, she presents it at this time. Whenever the family or members of the family are known to other social or health agencies such as the Family and Children's Service, or the Visiting Nurse Service or the School Health Service, representatives of these agencies are asked to attend and furnish the seminar with their information. Medical and social-worker advisors to the first- or second-year student whose family is being presented or consultants from other clinics who have seen the family or one of its members, are invited to attend the seminar so that they may add their knowledge of the family to the discussion and hear what others may know about the family.

Thus, in a short time, a great deal of information about the family under discussion is presented by the people who have had direct contact, and a comprehensive picture of the family and its problems is unfolded.

In the time remaining after presentation of all the data the clinic personnel and appropriate consultants discuss the outstanding medical, environmental and socio-economic problems and characteristics of the family and its members. Finally, the leader of the seminar summarizes the findings and recommendations. Accomplishment of the recommendations may take several weeks or months and often requires the combined efforts of the first- or second-year student assigned to the family plus the clinic staff. Sometimes the problems defy solution.

Some examples of the kinds of families and their problems which have been used as teaching material are:

1. A low income family with an obese mother of three children, two of whom are athyrotic and cretins. She presented herself early in her fourth pregnancy asking for help in preventing hypothyroidism in her unborn child. The combined resources of the departments of preventive medicine, pediatrics, obstetrics, the endocrine clinic, and the social service department were brought to bear on this problem. These fascinating medical and social problems presented excellent teaching material. This family, constantly in trouble financially, has illustrated many of the economic problems which plague families and the medical profession today.

2. A family with four children, one of whom is a juvenile delinquent in a detention home. The extreme complexity of the delinquency problem and the community resources, or lack thereof, available for dealing with it was brought clearly before the students.

3. An outbreak of influenza in November 1957 in a family of eight, with complications of pneumonia in the father who had had a partial lobectomy of the left lung in 1941, and encephalitis in the mother. The domestic turmoil coincident with the illness of the children, then the father, and finally the mother was strikingly demonstrated. This family outbreak occurring simultaneously with the world-wide pandemic of "asiatic" influenza afforded the opportunity to discuss in detail the epidemiology and pre-

vention of influenza from international, national, local, and familial points of view.

4. A family of eight of low socio-economic status with a mother who has rheumatic heart disease complicated by pregnancy and a history of cardiac decompensation during a previous pregnancy. Many of the characteristics so important in the epidemiology and management of rheumatic fever were illustrated. The question of sterilization was discussed, because these parents had never been able to use contraception successfully and another pregnancy might jeopardize the mother's health and the family's integrity.

As might be expected the problems of these familes run the gamut of human experience, yet they were selected for Family Clinic because they were reasonably "normal." As a result of experience gained, the term "normal family" is no longer used; rather, it is recognized that all families have problems of some kind—they are just different.

DISCUSSION

It should be pointed out at this time that the teaching program as described falls short of the ideal envisaged at the beginning. Comprehensive medical care to be truly comprehensive for the families should at the very least furnish the services of all the major specialties in the setting of the Family Clinic. This has not been accomplished, so that it is at times necessary to resort to the usual custom of referring patient to other clinics, thereby nullifying the original purpose. Ideally, the Family Clinic, in order to furnish more of the services a family needs, should operate more often than once a week. This, too, has not been possible for reasons of inadequate staff and inadequate time of the available staff. At the outset it was hoped that the student would follow the same family for 4 years. In practice he only follows his family for 2 years. The student would gain much from 4 years of observation of a family and actual responsibility for medical care of the same family during his 2 clinical years. It has not been possible to work out the mechanics of this desirable experience, but it is hoped this can be done in the future. A domiciliary care program was considered to be a part of the program during its initial planning. Again, the actual practice has fallen short, principally because of the complexities involved in sending students outside the hospital as "physicians," not the least of which is the shortage of competent supervisory staff.

Inadequate as it is when considered in the light of the ideal teaching program, the Family Health program in the setting of this medical school serves as a demonstration to students and faculty alike of a practical experiment designed to improve teaching and patient care. It has the virtue of bringing the student into contact with patients early in his medical education at a time when he might otherwise feel his preclinical studies are merely a continuation of his premedical preparation. Through the preparatory seminars and lectures during his first year, plus his experience as a health advisor in the student-family program during his first 2 years, and through his experience in the Family Clinic during his third and fourth years, it is hoped that the student will acquire experience which will help him to think in broad terms of patients, their families, and their medical and socio-economic problems and the epidemiologic characteristics of families which might favor health or illness. It is hoped also to instill in the student more of the philosophy of modern preventive medicine which takes the positive approach toward health and strives to promote good health and prevent sickness rather than just treat patients who are already sick. Care of the sick is not neglected, but in this teaching the emphasis is on the well-baby or the well-child or adult and the measures necessary to keep them well. The student is challenged to think of health and illness as complex family affairs which require many diverse fields of knowledge for their study and understanding. He is shown some of the techniques and services necessary and available for the comprehensive study and management of patients and their families.

Clinical Teachers' Views of the Basic Science Curriculum*

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PREFATORY NOTE

This study of factors underlying the attitudes of clinical teachers toward change in basic medical science curricula is a product of research that was initiated on behalf of the sixth AAMC Teaching Institute—the first Institute on Clinical Teaching—which was held in October, 1958.† The Planning Committee for this conference, finding that there existed almost nothing in the way of reference information about present-day clinical teaching practices in North American medical schools, designed an extensive survey of fact and opinion on this topic. Questionnaires addressed to Institute participants, medical school deans, department heads, faculty members, and hospital administrators resulted in a massive compendium of tabulated information. Many of these data are reproduced in the report of the 1958 Institute proceedings, and in a broad sense they provide a quantified characterization of current practice and opinion in clinical teaching. The significance of the information presented in any single table or group of tables does not become apparent, however, until the data are analyzed in terms of the context in which they were obtained. Differences among responses take on greater meaning when differences in characteristics of the respondents and of their circumstances are also understood. In the paper that follows, Dr. Kendall has made such a contextual analysis of one group of tables in the 1958 data. Another set of data concerning attitudes toward the internship was analyzed in preparation for the 1959 Institute, and will be reported in the proceedings of that meeting. Ideally, the entire compendium of information that is now available would undergo this type of analysis, and, although circumstances do not permit such a large-scale undertaking, it is anticipated that, as questions arise in related research activities and in the conduct of Association affairs, additional studies will be forthcoming.—HELEN HOFER GEE.

In preparation for the 1958 Teaching Institute, the first devoted to problems of clinical education, the Department of Research of the Association of American Medical Colleges collected a variety of information to be used as the basis for discussion by Institute participants.[1] Among the data assembled for these purposes are the responses to a questionnaire addressed to heads of the major clinical departments in the medical schools belonging to the Association, as well as the responses to a roughly similar questionnaire addressed to a sample of clinical faculty members in the same schools.[2] One of the questions asked of both groups reads as follows:

> In your opinion, should changes be made at your school in the amount of time allotted to each of the following sciences basic to medicine?

* This may be identified as Publication A-278 of the Bureau of Applied Social Research.

† H. H. Gee and J. B. Richmond (eds.), *Report of the First Institute on Clinical Teaching*. Evanston, Ill.: Association of American Medical Colleges, 1959.

[1] The development of the questionnaires and analysis of the returns were carried out by Dr. Helen H. Gee, Director of Research for the AAMC, Dr. Charles F. Schumacher, Assistant Director of Research, and members of their staff.

[2] Because these were mail questionnaires, the returns were not complete. Nearly three-quarters of the department heads who received the questionnaires returned them; among the clinical faculty, the comparable figure is somewhat lower—61 per cent. (See Table A.2 in Gee and Richmond, *op. cit.*, p. 156, for further details on the returns.) In her introduction to the *Analyses*, Dr. Gee cautions that the sample of clinical faculty members may not be entirely representative of the populations to which questionnaires were distributed. Since we shall be concerned mainly with comparisons of how the same people react under different conditions, the question of representativeness or lack of it is not particularly serious.

Anatomy	Microbiology
Behavioral sciences (e.g., psychology, sociology, anthropology)	Pathology
	Pharmacology
Biochemistry	Physiology
Biophysics	Radiation biology
Genetics	Statistics

In each instance, those answering the question were given the option of saying "more time," "less time," or "no change."

To a sociologist interested in processes of medical education, the replies given to this question are striking in several respects; it therefore seems appropriate to bring them to the attention of medical educators.[3]

Hesitancy in advocating changes.—Recent discussions of medical education have underscored the need for constant scrutiny and revision of the medical school curriculum in the light of the changing nature of medical practice and the expanding boundaries of medical science.[4] Medical schools have been portrayed as being in a state of "flux," and the "revolutions" that have taken place on some campuses have been widely described and commented on. Indeed, when a renowned medical educator points to some "lasting values in medical education" he reminds his audience that he is not recommending inflexibility nor denying the need for curricular change.[5]

Against this background, one would expect the clinical faculties of American medical schools to manifest receptivity to change in the medical curriculum. However, by and large, the preponderant emphasis in replies to the question on basic science courses is one of retaining, rather than modifying, the present distribution of time. As Table 1 indicates, a majority or near majority of the clinical department heads,

TABLE 1

RECEPTIVITY OF CLINICAL FACULTY MEMBERS TO CHANGE IN TIME ALLOTTED BASIC SCIENCE COURSES

BASIC SCIENCE COURSE	CLINICAL DEPARTMENT HEADS* Per cent advocating NO CHANGE‡	CLINICAL FACULTY† Per cent advocating NO CHANGE‡
Microbiology	79	84
Pharmacology	79	80
Physiology	78	77
Pathology	77	79
Biochemistry	73	77
Biophysics	51	65
Radiation biology	48	59
Anatomy	45	73
Statistics	45	59
Behavioral sciences	43	54
Genetics	35	67

* The figures reported here were obtained by averaging the responses of the different groups of department heads. There were a total of 391 department heads, distributed as follows: 78 from medicine, 67 from obstetrics and gynecology, 72 from pediatrics, 53 from preventive medicine, 66 from psychiatry, and 55 from surgery.

† These figures are, again, averages. A total of 1964 clinical faculty members returned the questionnaires. Their departmental affiliations are as follows: 40 from anesthesiology, 56 from dermatology, 519 from medicine, 25 from neurology, 135 from obstetrics and gynecology, 78 from opthalmology, 57 from otolaryngology, 94 from pathology, 200 from pediatrics, 29 from preventive medicine, 216 from psychiatry, 63 from radiology, 250 from surgery, and 59 from urology.

‡ Those who did not answer this particular question have been eliminated from Table 1.

and even larger proportions of clinical faculty members, advocate no change in the amount of time allotted to the several basic sciences about which they were queried. With one significant exception, this tendency not to advocate changes is especially pronounced when the well established basic science courses are under consideration. Thus, among both department heads and faculty members, approximately four out

[3] The results to be reported here are adapted from Table 1.2 on p. 12 and Table A.47 on pp. 189–91 of Gee and Richmond's report of the 1958 Teaching Institute.

[4] For some relevant comments, see George Packer Berry, "Medical Education in Transition," *J. M. Educ.*, **28**:17–42, 1953; W. Barry Wood, Jr., "The Underlying Cause of Unrest in University Medicine," *J.A.M.A.*, **164**:548–50, 1957; Mahlon Ashford, editor, *Trends in Medical Education* (New York: The Commonwealth Fund, 1949); Joseph D. Matarazzo, "Comprehensive Medicine: A New Era in Medical Education," *Human Organization*, **14**: 4–9, 1955; "Medical Education in the United States and Canada," *J.A.M.A.*, **161**:1637–81, 1956; and John E. Deitrick and Robert C. Berson, *Medical Schools in the United States at Mid-Century* (New York: McGraw-Hill Book Company, 1953).

[5] Herman G. Weiskotten, *J.A.M.A.*, **164**:533–37, 1957.

of five feel that no changes should be made in the time allotted to biochemistry, microbiology, pathology, pharmacology, or physiology. When these faculty members show receptivity to change, it is usually in connection with newer and less emphasized subject matter such as genetics, radiation biology, behavioral science, or statistics. As we shall have occasion to see, the general sentiment of those responding to the AAMC questionnaires favored allotting more time to these fields. The one exception to this general pattern is the attitude of the clinical department heads toward the courses in anatomy taught in their medical schools. More than half of these men would like to see some change in the amount of time devoted to this subject, and the large majority of those advocating change would like to see a reduction in the amount of time students spend in the course.

Without further information we can only speculate, of course, why the majority of clinical faculty members tend to be opposed to changes in the present allocation of time. One possibility is that the men who talk publicly and write about medical education, and from whom one gets the impression that change in medical school curricula is and should be the rule of the day, are a small and articulate minority whose views are not generally shared by most faculty members. In other words, the sentiments prevailing on medical school campuses may really be against the changes in the curriculum, and appearances to the contrary may result simply from the fact that a small group make their contradictory views widely known through their writings and speeches. Present evidence does not allow us to reject this possibility completely, but there are some indications that it is not the case. For, under certain conditions, which we shall elaborate later, these same men, who by and large recommend no change in the amount of time allotted to some basic sciences, are quite willing to advocate changes for other subjects. In other words, there does not appear to be a generalized opposition to all change.

Another possibility is that this opposition to change is more apparent than real. That is, these department heads and clinical faculty members may not be entirely happy with the state of affairs in the basic science curricula of their medical schools, but they may, at the same time, feel some hesitation about suggesting changes in connection with the courses which, beginning half a century ago, have contributed so much to raising the standards of American medical education. For it was the introduction and standardization of these basic science courses—notably anatomy, biochemistry, pathology, pharmacology and physiology—which helped materially to give the medical school a firm footing in the universities. Clinical faculty members may therefore feel it inappropriate for them to question whether the amount of time traditionally allotted to these courses is sufficient or excessive. Some support for this interpretation is the fact, previously noted, that it is in connection with these firmly established courses that the faculty members are least likely to recommend change.

We can carry this notion of "holding fast to the traditional pattern" one step further. If it plays a part, educators occupying positions of high prestige within the medical school hierarchy would experience less hesitancy in advocating change than their colleagues holding positions of lesser prestige. The former, we assume, would be more secure in their willingness to consider modifications of the basic science curriculum. This suggests, first of all, a comparison between the heads of clinical departments and the faculty members teaching in those departments. We can be sure that the faculty group includes men of varying prestige, dependent, among other things, on rank, achievement, and perhaps participation in professional societies. However, few if any of them have as high prestige, and therefore the same sense of self-assuredness, as a department head. For, unlike other sectors of many universities, the position of department chief in a medical school is usually one which the incumbent occupies

for the duration of his academic life, and it is usually one which carries with it many powers as well as obligations. According to this line of reasoning, department heads, having more security because of the higher prestige which they enjoy, should be more willing than other faculty members to suggest changes in the present allocation of time to the basic sciences, and they should also be more willing to express their opinions. Data from the AAMC questionnaires tend to confirm both of these expectations. Re-examination of the figures in Table 1 shows that, almost without exception, the department heads were more likely than other faculty members to recommend some changes. Moreover, failures to answer the questions at all were less than half as frequent among the department heads as they were among the other clinical faculty members: on the average, about 16 or 17 per cent, compared with approximately 40 per cent.[6]

The position a medical educator occupies in the formal structure of the medical school is one source of his prestige; but there is another. Although no effort will be made here to explore why this is the case, clinical specialties vary considerably in the prestige assigned to them and the men affiliated with them. This "informal" structuring[7] of the various specialties permits us to examine further the notion that the tendency not to recommend changes in the time given to basic science courses represents hesitancy on the part of many clinical faculty members; for, if this is the case, men from specialties having a relatively high level of prestige would experience less reluctance to recommend modifications of the curriculum than their colleagues in the less prestigious fields. More specifically, there should be a correspondence between the relative prestige of a clinical specialty and the willingness of its practitioners to recommend changes. Secondly, and this is only a variation of the previous statement, there should be a comparable correspondence between the prestige of the clinical specialties and willingness to express any opinion at all on the question of time allotted to basic science courses.

Again, the data tend to bear out these expectations. Faculty members responding to the questionnaire sent out in preparation for the 1958 Teaching Institute represented fourteen different clinical departments. Now it so happens that eleven of these fourteen specialties were assigned prestige ratings by a sample of faculty members (including basic scientists) who filled out a questionnaire used in connection with the 1957 Teaching Institute.[8] Using this information, we can examine whether the data are consistent with the foregoing expectations.

Before considering Table 2 in detail, we should understand the numerical entries in it. The prestige rankings offer few difficulties: on the basis of faculty responses to the 1957 AAMC questionnaire, it was found that surgery was assigned the top prestige

[6] Following this same line of reasoning, willingness to recommend changes should vary according to academic rank in the medical school, and according to full-time vs. part-time status. The tabulations through which these expectations could be examined are not yet available, however.

[7] It is informal in the sense that there is no official or explicit policy that one field has higher prestige than another. And yet, as we shall see, there is general agreement that this is the case.

[8] The question that they were asked was adapted from an item developed for use in the continuing studies of medical education being conducted by the Bureau of Applied Social Research, Columbia University, with support from the Commonwealth Fund. It read: "Everyone recognizes that it is difficult to generalize about the medical profession as a whole. In your judgment, what is the average prestige that members of the medical profession at large assign to each of the following types of doctors?" There followed a list of eleven specialties, with a request that each one be rated on a scale from "very high prestige" to "very low prestige." (The list included a twelfth category—"general practitioners"—which has been omitted from the present analysis.) For further details on this rating, see George G. Reader, "Development of Professional Attitudes and Capacities" in *The Ecology of the Medical Student*, Helen H. Gee and Robert J. Glaser (eds.), *J. M. Educ.*, 33:1958, Part 2. It may be noted in passing that there is a high consensus about the relative prestige of these different fields: faculty members in one department provide rankings which are in almost exact agreement with those offered by men in other departments; students in one school give responses which are almost identical to those obtained in other schools; and students at different stages of their training are in close agreement.

rating, medicine the second, neurology the third, and so on. (It will be noted that three fields are each assigned the rank of 7; they were tied for 6th, 7th, and 8th ranks, and therefore all were assigned the average of the three ranks.) Similarly with the other two columns of Table 2. It was found that, on the average, dermatologists have the highest number of "no change" responses; they were therefore assigned the top rank of 1. At the other extreme, pathologists, on the average, gave the smallest number of "no change" responses, and were therefore assigned the bottom rank of 11. (Again, when the representatives of two fields were tied in their average "no change" responses, each was given the average of the tied ranks.) So it is with the percentages of failures to answer the question at all. Again, it was found that dermatologists have the highest rate of no answers; again, therefore, they received the top rank of 1. Men in pathology and obstetrics-gynecology have the same small percentage of no answers and therefore shared the lowest ranks of 10 and 11.

TABLE 2

CORRESPONDENCE BETWEEN PRESTIGE RATING OF SPECIALTY AND PROPORTIONS OF ITS PRACTITIONERS ADVOCATING NO CHANGE OR GIVING NO RESPONSE

Field*	Prestige rank	Rank of per cent "No CHANGE"†	Rank of per cent No ANSWERS†
Surgery	1	8.5	9
Medicine	2	10	8
Neurology	3	5.5	5.5
Ob.-gyn.	4	3	10.5
Pathology	5	11	10.5
Ophthalmology	7	2	2
Pediatrics	7	8.5	5.5
Radiology	7	5.5	7
Otolarnygology	9	7	4
Psychiatry	10	4	3
Dermatology	11	1	1

* The three clinical departments excluded from this analysis because no prestige rankings are available are anesthesiology, preventive medicine, and urology.

† The per cent "no change" and the per cent no answers were based on different numbers. The percentage of no answers was based on the total number of men within a particular department who returned the questionnaires; the percentage of "no change" replies was based on the total number who answered the questions, that is, the total returns less the no answers.

Examining the data more carefully, one notices a negative relationship between the prestige rankings and the other two rankings. The fields which rank high in prestige tend to rank low in the percentage of men recommending no change, and low also in the percentage who failed to answer the question at all. Conversely, the fields which rank low in prestige tend to rank high in the percentage of "no change" replies and in the incidence of no answers as well. Of course, these negative relationships are by no means perfect. However, the extent to which they do exist may be determined by what is called the "coefficient of rank-order correlation." This is designed to measure how closely the rankings on one dimension (e.g., prestige) correspond to the rankings of the same objects on a second dimension (e.g., no answers). If the ranks correspond completely, the coefficient has a value of $+1.000$; if they are completely reversed, the coefficient has a value of -1.000. A complete absence of any correspondence—when there is no pattern at all to the two sets of rankings—would result in a coefficient with a value of 0. In the present case, the coefficient of correlation between prestige and the percentage of "no change" responses is $-.514$, and the coefficient between prestige and the percentage of no answers is $-.727$. In both instances, then, there is a sizable negative relationship. If a field ranks high in prestige there is a strong tendency for it to rank low in its rate of "no change" responses (i.e., to have given few "no change" replies) and also in its rate of no answers. If, on the other hand, a field ranks low in prestige there is the same strong tendency for it to rank high in its rate of "no change" responses and no answers. This, it was suggested earlier, is consistent with the notion that at least one of the factors inhibiting these faculty members from suggesting modifications in the time devoted to basic science courses is a feeling that it would be inappro-

priate for them to do so. Judging from the prestige ratings of the departments with which they were affiliated, the lower the standing of their field the more apt they were to refrain from advocating any change.

Expanding frontiers of the basic sciences.—So far, in considering clinical faculty members' judgments regarding the amount of time devoted to basic science courses, we have dealt only with the proportions who felt that no modifications should be suggested. However, quite naturally, each of these basic science courses has its proponents—those who believe that more time should be devoted to it; and each also has its opponents—those who believe that the course already commands more time than it should.[9] Table 3 shows that these partisan groups are sometimes a sizable proportion of the total but, more importantly, that they are quite differently distributed with respect to the different courses.

Table 3 indicates that the heads of clinical departments and the faculty of their departments tend to agree with each other.[10] When one group recommends an extension in the amount of time devoted to a particular course, the other group is also likely to do so; when one group expresses the belief that a specific course takes up too much time, the other group tends to do so also.

Table 3 also shows that the proponents of these basic science courses generally outnumber the opponents. That is, with the single exception of anatomy, when a significantly large number of faculty members or department heads are in favor modifying the amount of time devoted to basic science courses, they recommend increasing the time allotted to them.

However, the most striking feature of Table 3 is the kind of basic science courses which received this encouragement. As was suggested earlier, it is the newer and less emphasized courses, like genetics, statistics, radiation biology, the behavioral sciences and biophysics, for which more time was recommended. In part, this result may be a statistical artifact. The department heads

TABLE 3

FACULTY'S RECOMMENDATIONS REGARDING CHANGES IN TIME ALLOTTED TO BASIC SCIENCE COURSES

	CLINICAL DEPARTMENT HEADS		CLINICAL FACULTY	
BASIC SCIENCE COURSE	Per cent advocating MORE time*	Per cent advocating LESS time*	Per cent advocating MORE time*	Per cent advocating LESS time*
Genetics	62	3	26	7
Statistics	52	3	31	10
Radiation biology	49	2	38	3
Behavioral sciences	46	11	31	15
Biophysics	45	4	30	5
Biochemistry	19	8	16	7
Physiology	16	6	20	3
Pharmacology	7	14	13	6
Microbiology	6	15	8	8
Pathology	4	19	16	5
Anatomy	4	51	7	20

* Because of the small number of cases involved in some instances, it was not possible to repercentage the partisan groups leaving out those who recommended no change. As a result, the percentages saying "more time" and "less time" do not add up to 100 per cent; to obtain 100 per cent, the proportion saying "no change" must also be included (see Table 1).

[9] Of course, the simple responses "more time" or "less time" leave it entirely indefinite how much more or how much less time the faculty members have in mind when they make their recommendations. Some who say that a particular course should have "less time" may be thinking in terms of reducing the course by 5 or 10 hours; others may be thinking in terms of cutting the alloted time in half; and still others may have in mind the complete elimination of the course. Because of this indefiniteness, the results we obtain may be less clear-cut than they might be if we were able to sub-divide the respondents further according to the specific details of their recommendations.

[10] The major exception to this general agreement is found in connection with the course in pathology: among department heads, the ratio of opponents to proponents of this course is almost five to one, whereas among clinical faculty members, the ratio of proponents to opponents is slightly more than three to one. This disagreement seems to result from differences in the composition of the two groups. Among the nearly 400 department heads there were no pathologists; among the nearly 2,000 faculty members there were nearly 100 pathologists. (See the notes in Table 1 for more exact figures.) How such differential composition could account for the disagreement between the two groups will be considered later on.

were asked which, in this list of basic science courses, were taught in their medical school and which were not. While none, of course, reported a failure to teach anatomy, biochemistry, pathology, pharmacology, or physiology, 29 per cent reported that genetics was not taught in their medical school, 17 per cent gave the same report for statistics, 25 per cent indicated an absence of courses in radiation biology, 22 per cent said that there were no courses in the behavioral sciences, and 26 per cent stated that biophysics was taught nowhere in their medical schools.[11] If any curricular changes involving these courses are to be made in these schools, it can only be in the direction of devoting more time to them.[12]

This is not a complete explanation, however. While 29 per cent of the department heads said that genetics was not taught in their schools, 62 per cent are in favor of devoting more time to this field—and, similarly, with the other courses which are less well established. Thus, there is some feeling that these fields should receive greater emphasis even in institutions where relevant courses are already taught, although presumably to a limited extent. In part the encouragement given these courses may be the result of stimulation afforded by the AAMC Teaching Institutes: for example, the second one, held in 1954, outlined the importance of genetics as a field of scientific inquiry and as a field with significant clinical applications; the attitudes of the department heads and clinical faculty members toward genetics may reflect what they learned through attendance at the Institute or study of its proceedings. In part the favorable attitude toward these newer courses may develop in response to needs of the times: for example, continuing debate about the effects of atomic fall-out makes it difficult to deny the importance of studying radiation biology; and, in part, receptivity to these developing basic sciences may represent a response to changing conceptions of medical practice: for example, as more and more medical educators come to understand what is meant by comprehensive medical care, the relevance of the behavioral sciences may be increasingly appreciated. Whatever the sources of encouragement for these courses, the responses of department heads and clinical faculty members who answered the AAMC questionnaires make it clear that, when they are willing to consider changes in the basic science curriculum they are also in favor of giving a chance to fields which are still relatively untried.

The influence of relevance.–Up to this point we have not considered the recommendations which representatives of different fields of specialization make with regard to particular basic science courses. We have either examined the suggestions made by the total group of department heads or clinical faculty members in connection with specific courses (see Table 1 and Table 3), or we have studied the over-all responses made by men in different clinical fields (see Table 2). It now seems appropriate to inquire whether departmental affiliation plays any role in the recommendations which clinical faculty members make with regard to specific basic science courses.

We can have two alternative expectations. If there were some objective basis for saying how much a medical student needs to know about each of the basic science fields, and if these objective needs are widely known to medical educators, there should be general agreement, among representatives of all departments, about the allocation of time to the basic sciences. However, these objective criteria do not now exist, and, indeed, it is hard to visualize that they ever will. In their absence, we assume that medical educators are forced to fall back on more subjective criteria. Some of these may be quite fortuitous, and therefore distributed at random throughout

[11] These data are taken from Table 1.3, p. 13 of the Gee and Richmond, *Report of the First Institute on Clinical Teaching*, 1958.

[12] Further analysis of the data, not yet available, would indicate whether recommendations to increase the time devoted to these courses are largely confined to medical schools which do not at present give any time to them.

the faculty. For example, in one medical school the men charged with teaching a particular basic science field may do such an effective job that some of their clinical colleagues feel they ought to be given more time; or an individual may have had a difficult time with one of the basic sciences when he was a medical student, and he may therefore recommend a curtailment of the time allotted to it. If subjective considerations of this kind were the only ones guiding expressions of opinion, there would be no differences between departments in the recommendations made. However, we expect that another subjective criterion of considerable force will be, understandably enough, the clinical man's appraisal of the pertinence a particular basic science has for his field of specialization. We assume that medical educators will tend to define as important, and therefore as deserving of more time, those basic science courses which they believe are of direct or indirect relevance to their own field of work. Furthermore, when they perceive a basic science field as having relevance for their speciality, we expect these clinical educators to experience less hesitancy than their uninvolved colleagues about recommending changes in the time allotted to the course. If this subjective criterion of perceived relevance does in fact operate, then there should be patterned variations from one department to another in the recommendations that are made, for, within any one department, there should be close agreement about the relevance or irrelevance of a specific basic science field.

Once more these expectations find support in the AAMC data. Two of the basic sciences included in the list—pathology and radiation biology—have counterparts among the clinical groups responding to the questionnaires. Thus, there is the basic science of pathology and there is also the specialty of clinical pathology; there is the basic science of radiation biology and, also, the clinical specialty of radiology. In effect, then, two groups of clinical faculty members were asked for recommendations regarding basic science courses immediately related to their own departments. In both cases, two things happened. First, the involved faculty members, those in clinical pathology and radiology, were much more likely to recommend changes; and, second, they were markedly in favor of having these changes take the form of increased time for the directly related courses.

Pathology, we recall, is one of the firmly established basic sciences for which a change in allotted time was only rarely suggested by the entire sample of clinical educators; yet half of the clinical pathologists recommended changes, and nearly all these believed that more time should be devoted to the subject. Radiation biology is one of the newer basic sciences, not yet taught in all medical schools, and one for which many of the clinical faculty in general suggest modifications. Even so, the radiologists have attitudes radically different from those of other clinical faculty members. Almost three-quarters of them suggest changes in the amount of time devoted to radiation biology, and of those almost all recommend that more time be given to the course (Table 4).

TABLE 4

RECOMMENDATIONS FOR CHANGE IN DIRECTLY RELATED BASIC SCIENCE COURSES

	PREFERRED TIME ALLOTMENT			
	More time	Less time	No change	TOTAL CASES
Course in pathology:				
Pathologists	48	3	49	75
Other clinicians	14	5	81	1043
Course in radiation biology:				
Radiologists	69	4	27	48
Other clinicians	36	3	61	1020

Not all the clinical specialites have such closely corresponding courses in the basic sciences, so that it is not possible to extend this line of analysis any further. Nonetheless, the different basic science courses are of varying relevance to the several specialties: between some of the basic sciences and clinical specialties there is a substantive

"affinity" that is lacking in other combinations. This shows up quite clearly in the recommendations of the clinical faculty members. For example, Table 5 considers suggestions made with regard to courses in anatomy by representatives of clinical departments having varying degrees of affinity for that field.

For practitioners of the first three specialties listed in Table 5, anatomy has less relevance than it does in other fields; they therefore recommend either that no change be made or that the amount of time devoted to it be reduced. With surgeons and otolaryngologists, however, it is quite a different story. In both of those specialties, anatomy plays an important and obvious role; among these educators, therefore, significant minorities suggest that more time should be given to anatomical studies.

The influence of relevance is also apparent in the recommendations made regarding other basic science courses. When the behavioral sciences are under consideration, for example, some of the specialists included in Table 5 completely reverse the positions they had taken in regard to anatomy.

As Table 6 shows, psychiatrists and men in preventive medicine, who were strongly in favor of reducing the amount of time given to anatomy, are even more strongly in favor of increasing the amount of time given to the behavioral sciences. This is so, presumably, because they believe that the behavioral sciences are relevant and can contribute to the professional problems with which they deal.

The final example is provided by pharmacology. Anesthesiologists, who have a direct and central interest in the action of

TABLE 5

RECOMMENDATIONS REGARDING COURSE IN ANATOMY ACCORDING TO CLINICAL DEPARTMENT

DEPARTMENT	PREFERRED TIME ALLOTMENT: More time	Less time	No change	TOTAL CASES
Medicine:				
Department heads	0	66	34	71
Clinical faculty	5	33	62	343
Preventive medicine:				
Department heads	0	58	42	38
Clinical faculty	0	42	58	19
Psychiatry:				
Department heads	2	64	34	50
Clinical faculty	2	36	62	112
Surgery:				
Department heads	11	28	61	53
Clinical faculty	23	12	65	177
Otolaryngology:				
Clinical faculty	23	3	74	35

TABLE 6

RECOMMENDATIONS REGARDING COURSE IN BEHAVIORAL SCIENCE ACCORDING TO CLINICAL DEPARTMENT

DEPARTMENT	PREFERRED TIME ALLOTMENT: More time	Less time	No change	TOTAL CASES
Preventive medicine:				
Department heads	70	2	28	40
Clinical faculty	57	0	43	21
Psychiatry:				
Department heads	85	2	13	60
Clinical faculty	68	1	31	138
Surgery:				
Department heads	16	22	62	49
Clinical faculty	15	33	52	168

drugs, are more likely than other clinical faculty members to state that more time should be devoted to this course, and less likely to state that the allotted time should be reduced (Table 7).

SUMMARY

This paper has reviewed the suggestions of heads of clinical departments and of a sample of clinical faculty members about changes in the basic science curricula of their medical schools. The main findings are as follows:

1. Although public statements by medical educators have often called for changes in the medical school curriculum, these department heads and clinical faculty members tend, *as a whole*, not to recommend any changes at all. This is especially marked in connection with well-established courses in the basic sciences.

2. When changes are recommended, they seem in general to involve the newer and peripheral basic science fields. The medical educators more often advocate that these courses be given a greater chance to prove themselves than they have had in the past.

3. Not all clinical faculty members agree on the courses to be modified, or whether the modifications should involve allocation of more or less time. But the pattern of their disagreement is largely predictable. For the most part, the suggestions that they make are guided by the needs and concerns of the specialty field which with they are affiliated.

TABLE 7

RECOMMENDATIONS REGARDING COURSE IN PHARMACOLOGY ACCORDING TO CLINICAL DEPARTMENT*

DEPARTMENT	PREFERRED TIME ALLOTMENT: More time	Less time	No change	TOTAL CASES
Anesthesiologists	32	0	68	25
Other clinicians	12	7	81	1075

* There were no anesthesiologists among the department heads; so these data include only clinical faculty members.

If a basic science course is relevant to their own field, clinicians tend to recommend that more time be devoted to it; if the course is of little relevance to their specialty, they tend to recommend that less time be given it.

These findings seem quite provocative, and it is to be hoped that they will stimulate useful discussion.

An "Actuarial" Approach to Medical Student Selection*

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INTRODUCTION

Although the problem of medical student selection has received a great deal of attention at the national level in recent years (1–3), the need for improved techniques has again been re-emphasized by the disturbing discovery that the proportion of qualified college graduates applying for entrance to medical school is apparently decreasing (4).

As stressed by Dr. W. W. Morris at the 1957 meeting of the A.A.M.C. "Continuing Group on Student Evaluation" (1, p. 12), there is a great need for intensive selection studies at individual medical schools to supplement the more broadly oriented studies conducted on a national level by the Association of American Medical Colleges.

This paper reports a detailed study of 688 medical students who entered the Upstate Medical Center during the 9-year period from September, 1949, through September, 1957, and provides an "actuarial" approach to the prediction of success or failure in this particular institution. In the same way that an insurance company decides whether to accept a client on the basis of an "actuarial" analysis of past experience with people of the same age, sex, and health problems, so an Admissions Committee can help decide whether to accept an applicant on the basis of its past experience with candidates of the same age, sex intelligence quotient, etc.

Although the correlation technique was extensively used in earlier studies at this school, the "actuarial" approach has proved to be of great value in the practical selection situation. For example, it seems much more meaningful to an Admissions Committee to know that students with an Otis IQ of 114 or below have had a 30 per cent "mortality rate" at our school than to know that the correlation between Otis scores and medical school grades has been .28.

The findings reported in this study are of three main types: (*a*) single selection factors, such as age, (*b*) multiple selection factors, such as patterns of Medical College Admissions Test subscores, and (*c*) an analysis of students selected from various undergraduate colleges.

SINGLE SELECTION FACTORS

Table 1 shows the relationship between age at time of admission and success in our medical school. As an illustration of how to read this and future tables, line 1 indicates that, during the 9-year period studied, only nineteen students between the ages of 18 and 19 were admitted and that of these, one (or 5 per cent) failed or withdrew from his medical training. The other 95 per cent have successfully graduated or are still in attendance. Those of age 20–22, who constitute the vast majority of all students admitted, similarly have a low loss rate of 6 per cent. As we examine the older students we see a consistent rise in loss rate all the way up to 71 per cent

* This article is based in large part on a paper presented at a Conference for Premedical Advisors held at the Upstate Medical Center on November 8, 1958.

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for students older than 32 at time of entrance.

In Table 1B we find that our women students have had a 25 per cent loss rate as opposed to a 10 per cent rate for male students. Although statistical analysis shows a very slight possibility that these are "chance" differences, this would appear to be very remote. By having the actual *numbers* of cases as well as the percentages right before the Admissions Committee, a common-sense judgment concerning the probable reliability of percentage differences is more likely to be made.

Table 1C suggests that students who were married at time of admission have had a somewhat higher chance of running into academic difficulty than those who are

TABLE 1

RELATIONSHIP BETWEEN SINGLE SELECTION FACTORS AND STUDENT SUCCESS AT THE UPSTATE MEDICAL CENTER, 1949–1957

Category	Total in group*	Losses† No.	Losses† Per cent
A. Age at time of admission			
18–19	19	1	5
20–22	464	28	6
23–25	127	18	14
26–28	53	13	25
29–32	18	6	33
33+	7	5	71
Total	688	71	10
B. Sex			
Male	656	63	10
Female	32	8	25
Total	688	71	10
C. Marital status at time of admission			
Single	613	59	10
M—no children	47	7	15
M—children	28	5	18
Total	688	71	10
D. Residence			
Upstate New York	452	53	12
Downstate N.Y.	172	8	5
Out-of-state	54	5	9
Foreign	10	5	50
Total	688	71	10
E. No. of colleges attended			
One	566	50	9
More than one	122	21	17
Total	688	71	10
F. Major field			
Premedical	173	16	9
Biol.-Zool.	252	28	11
Chemistry	125	6	5
Physics or Math.	13	2	15
Subtotal—Science	(563)	(52)	(9)
Non-Science	104	17	16
Non-Lib. Arts	21	2	10
Total	688	71	10
G. No. of science courses			
4	36	7	19
5–6	320	34	11
7–10	285	27	9
11+	47	3	6
Total‡	688	71	10
H. Recommendations			
Excellent	115	6	5
Good	365	38	10
Average or below	56	11	20
Not included in study	152	16	11
Total	688	71	10
I. Interview impression			
Excellent	178	9	5
Good	613	59	10
Average or below	141	25	18
Total‡	932	93	10
J. Otis IQ			
130+	106	7	7
125–129	105	9	9
120–124	60	6	10
115–119	39	5	13
114–	20	6	30
Test not taken	358	38	11
Total	688	71	10

* 688 students in the classes entering the Upstate Center from September, 1949, through September, 1957.

† Losses = Failures (51 or 7 per cent) and withdrawals (20 or 3 per cent) throughout the four years of medical school.

‡ These totals are higher than for other tables because some candidates had more than one interviewer.

single, and that those who were parents have had almost twice the loss rate of the unmarried. As with most single selection factors, however, it should be noted that these results may be due to other variables as well. For example, the lower loss rate of the single students may be a reflection of their tendency to be younger than their married classmates.

Table 1D reveals that Upstate New York residents have had a significantly higher loss rate than their downstate classmates; that our out-of-state students have fallen between these two groups; and that only half of our foreign students have met with success. The fairly high "upstate" loss rate reflects the preferential admission of students from that area.

In Table 1E we make the interesting discovery that our students who have attended more than one undergraduate college have almost twice the loss rate of those who took all their training in one institution. Although many students have valid reasons for transfer, findings of this type have alerted our committee to scrutinize with extra care the reasons for applicants attending multiple colleges.

Table 1F summarizes the undergraduate majors of our student body over this 9-year period and reveals that our nonscience majors have had a somewhat greater loss rate than those with the more traditional premedical training. Similarly, Table 1G shows a consistent relationship between medical school success and the number of science courses taken at the college level.

It is gratifying to see in Table 1H that the recommendations upon which college advisors work so hard do seem to be predictive of success at our medical center. Only 5 per cent of those with excellent recommendations have been lost to medicine, as contrasted with 4 times as many, or 20 per cent of those with "average or below average" recommendations.

We find in Table 1I that our interviewers' over-all impression of the candidates have also been predictive of medical school success. It is interesting to note, incidentally, that the percentage of loss in the three categories of "excellent," "good," and "average or below" is almost identical for our interviewers and for the undergraduate college evaluations shown in Table 1H.

Table 1J similarly shows a consistent relationship between medical school success and scores on the Otis Test of Mental Ability. Even more significantly, however, it suggests a possible Otis IQ "cutoff" score for our school in the neighborhood of 115.

MULTIPLE SELECTION FACTORS

Although it is helpful and indeed essential to have data on single factors such as those illustrated above, there are so many variables to be considered in deciding whether or not to accept a candidate that the multiple approach seems to hold even more promise than the single-factor one.

In Table 2A, for instance, we have applied a method of analysis (developed by Dr. Chester Yntema of our Department of Anatomy) to all possible combinations of subscores on the Medical College Admissions Test. Among the interesting findings is the fact that, of the 267 students with no subscores below 500, only 4 per cent have been lost to medicine. On the other hand, those with all four subscores below 500 had a 15 per cent "loss and repeat" rate, and those with such patterns as low quantitative and science scores had almost a 50 per cent "loss and repeat" rate. Surprisingly enough, the 15 per cent figure is no worse than that for the student body as a whole, probably owing to more careful screening of candidates with all four subscores below 500. The much higher "loss and repeat" rate for those with mainly quantitative and science scores below 500, however, illustrates the potential value of this "pattern" approach to MCAT interpretations.

Table 2B further underlines the predictive value of the quantitative and science pattern at our school and reveals that 43 per cent of all students with low scores in both of these categories had academic difficulty, compared with only 19 per cent of those with other scores below 500.

Table 2C illustrates a multiple-factor approach to selection based on not only (*a*) the individual's own MCAT but also on (*b*) the average MCAT of his college and (*c*) his undergraduate grade average. (This composite rating was also devised by Dr. Yntema.) As you will note, students with predicted first-year averages of 76 and 77 had almost a 60 per cent failure rate in the first year of medical school, whereas those with predicted averages of 78 and 79 had only a 16 per cent rate and those with 80 or above only lost 7 per cent. Although "chance" factors may be operating here, particularly in the 76 and 77 category, the difference is striking enough to encourage further study of this composite rating on future classes.

TABLE 2

RELATIONSHIP BETWEEN MULTIPLE SELECTION FACTORS AND STUDENT SUCCESS AT THE UPSTATE MEDICAL CENTER, 1949–1957

A. PATTERNS OF MCAT SUBSCORES

Subscores below 500*	Total in group	Losses† No.	Losses† Per cent	Losses and repeats‡ No.	Losses and repeats‡ Per cent
1	42	3	7	5	12
2	44	8	18	10	23
3	24	1	4	4	17
4	37	5	14	9	24
1, 2	16	1	6	2	13
1, 3	25	2	8	5	20
1, 4	5	2	40	4	80
2, 3	10	0	0	0	0
2, 4	19	4	21	9	47
3, 4	8	2	25	2	25
1, 2, 3	12	3	25	3	25
1, 2, 4	9	4	44	4	44
1, 3, 4	15	1	7	3	20
2, 3, 4	7	2	29	2	29
1, 2, 3, 4	20	2	10	3	15
Subtotal	293	40	14	65	22
None below 500	267	12	4	19	7
Total with MCAT	560	52	9	84	15
No MCAT	128	19	15	24	19
Total	688	71	10	108	16

B. QUANTITATIVE (2) AND SCIENCE (4) SCORES AS PREDICTORS

Subscores below 500*	Total in group	Losses† No.	Losses† Per cent	Losses and repeats‡ No.	Losses and repeats‡ Per cent
2, 4	19	4	21	9	47
1, 2, 4	9	4	44	4	44
2, 3, 4	7	2	29	2	29
Subtotal	35	10	29	15	43
Others below 500	258	30	12	50	19
Total below 500	293	40	14	65	22

C. COMPOSITE RATING AS A PREDICTOR

Rating§	Total in group	First-year failures# No.	First-year failures# Per cent
76–77	12	7	58
78–79	63	10	16
80+	480	33	7
Total‖	555	50	9

D. OVER-ALL SCORE BASED ON 16 FACTORS**

Category	Total in group	Losses† No.	Losses† Per cent
80+	45	1	2
70–79	80	8	10
60–69	31	6	19
59–	3	3	100
Score not available	529	53	10
Total	688	71	10

* 1 = Verbal; 2 = Quantitative; 3 = Modern Society; 4 = Science.

† Losses = Failures and withdrawals throughout the 4 years.

‡ Repeats = Those who have repeated all or part of a school year but are still in school or have graduated.

§ A predicted first-year average derived from (*a*) the student's MCAT, (*b*) the Mean MCAT of his college, and (*c*) his undergraduate grades. The passing grade is 75.

Those failing to complete the freshman year on schedule for academic reasons—includes failures, academic withdrawals, and those repeating entire year; excludes nonacademic withdrawals and partial repeaters.

‖ Excludes 128 students with no MCAT and five foreign students with ratings under 80.

**Based on (*a*) age, (*b*) undergraduate grades, (*c*) required science grades, (*d*) quantitative and (*e*) science MCAT subscores, (*f*) the average MCAT of the applicant's college, (*g*) recommendations, (*h*) extracurricular activities, (*i*) other nonacademic responsibilities, (*j*) financial plans, (*k*) health, (*l*) communication skills, (*m*) personality, (*n*) capability, (*o*) motivation, and (*p*) the interviewer's over-all impression of the candidate.

Our most ambitious attempt at a multiple-selection factor approach is illustrated in Table 2D by way of a so-called "over-all score" which is based on the sixteen factors indicated in footnote **. (This 16-factor approach was developed jointly by Dr. Yntema, Dr. Murray Wexler, formerly of our Department of Psychiatry, and the writer.) About half of these factors are relatively objective, and the other half involve subjective ratings by the interviewer. As Table 2D indicates, there is a promising relationship between these scores and success in medical training at our school, with almost 100 per cent accuracy of prediction for those with "over-all scores" above 79 or below 60. Since these findings are based on only two classes of students, however, we plan to treat these results with caution until we build up our data by further study on future classes.

TABLE 3

PERFORMANCE BY SELECTED COLLEGES SUPPLYING TEN OR MORE STUDENTS TO THE UPSTATE MEDICAL CENTER FROM 1949 TO 1957

College	No. students	Mean MCAT of All applicants	Mean MCAT of SUNY students	Per cent students with college grades of A	B	C	Per cent students with recommendations of Exc.	Good	Av.	Per cent in cum. ¼ of class U	M	L	Losses* No.	%	Losses and Repeats† No.	%
A	28	490	517	14	82	4	21	61	18	21	36	43	4	14	8	29
B	22	561	561	5	95	0	9	77	14	20	35	45	3	14	3	14
C	32	584	599	3	81	16	6	72	22	59	28	13	0	0	0	0
D	24	545	522	4	50	46	50	42	8	8	33	59	4	17	5	21
E	14	527	586	21	79	0	21	79	0	43	36	21	0	0	0	0
F	10	517	496	10	90	0	10	90	0	30	40	30	1	10	1	10
G	35	566	570	0	86	14	6	68	26	24	44	32	2	6	2	6
H	21	499	525	24	76	0	14	72	14	19	38	43	1	5	1	5
I	23	558	548	4	78	18	9	52	39	30	48	22	1	4	3	13
J	13	446	528	15	77	8	23	69	8	15	15	70	2	15	2	15
Total or average	222	537	550	9	79	12	17	66	17	28	36	36	18	8	25	11

* Losses = Failures and withdrawals.

† Repeats = Students repeating all or part of a school year.

By contrast, college D supplied students of a lower MCAT than that of their general premedical student body, and even though only 4 per cent had A averages and 46 per cent C, half received "excellent" recommendations and only 8 per cent were recommended as "average or below." In terms of performance, almost 60 per cent were in the lower third and over a fifth encountered academic difficulty in medical school.

In practice, findings such as the above mean that a student from college C is admitted with hardly a second thought as long as he is reasonably well recommended by the premedical committee; whereas stu-

UNDERGRADUATE COLLEGE DATA

Finally, we turn to some findings on undergraduate colleges which proved to be very revealing and helpful in our selection process. Table 3 summarizes the performance of students from ten colleges that supplied ten or more students to our classes entering during the 9-year period from 1949 to 1957.

As can be seen from studying the table, the contrast between colleges is fairly great. For instance, college C supplied 32 students with an average MCAT of almost 600. Although only a small percentage of these students had an A average or received "excellent" recommendations, almost 60 per cent ranked in the upper third of their medical school class, and none of them has failed, withdrawn, or had to repeat courses.

dents from college D are being screened with increasing care, and little weight can be given to their premedical recommendations.

SUMMARY

An "actuarial" approach to medical student selection has been illustrated by an analysis of the success and failure of 688 medical students who entered the State University of New York Upstate Medical Center between 1949 and 1957. This approach is applied to *multiple selection factors*, such as patterns of MCAT subscores, as well as to *single selection factors*, such as age. In addition, some marked differences in *undergraduate colleges* are revealed by this method of analysis.

Although it should be stressed that these specific findings would not necessarily be valid at other medical schools, the type of analysis herein illustrated might well prove of value elsewhere. By sharing such findings on selection techniques (as well as by more effective "recruiting" efforts), it is hoped that American medical schools will increasingly attract and select the best of our talented and dedicated youth.

REFERENCES

1. Association of American Medical Colleges. Problems in Medical Student Selection. Evanston, Illinois, 1958.
2. GEE, H. H., and COWLES, J. T. The Appraisal of Applicants to Medical School. J. M. Educ., **32**, Part 2, 1957.
3. GOTTHEIL, E., and MICHAEL, C. M. Prediction Variables Employed in Research on the Selection of Medical Students. J. M. Educ., **32**:131–47, 1957.
4. KLINGER, E., and GEE, H. H. The Study of Applicants, 1957–58. J. M. Educ., **34**:424–35, 1959.

The Columbia University Psychoanalytic Clinic

An Experiment in University Teaching in Psychoanalysis

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Recent articles in this journal (2, 6, 13) bear witness to the degree to which psychoanalysis and psychodynamic psychiatry have made contributions to the teaching of psychiatry in medical schools. The coming together of psychoanalysis and medicine was a part of the original hope of Sigmund Freud, the founder of psychoanalysis. However, during his lifetime his hopes were not to be realized. The startling novelty of Freud's discoveries, among which was his recognition of the importance of sexual factors in neurosis, brought only prejudice from most medical colleagues and a closed door to academic medicine in Europe. This response, however, did not deter the adherents of analysis, and a psychoanalytic movement was begun.

In the late twenties, an increased number of the younger American psychiatrists went to Europe to be analyzed and studied at the established psychoanalytic institutes, particularly in Vienna and Berlin. This group of new recruits greatly strengthened the older American psychoanalytic group which had been trained by Freud himself. It was not until the early 1930's that organized training of analysts in the United States was initiated through the establishment of independent psychoanalytic institutes in New York, Washington-Baltimore, and Boston, which largely operated as night schools. It must be mentioned, however, that the New York Psychoanalytic Society had established an Education Committee in 1923, and training on an informal basis had started much earlier in these three centers.

Psychoanalysis was first introduced into a university curriculum in the United States around 1930, when Dr. Franz Alexander was made Professor of Psychoanalysis at the University of Chicago; yet his academic responsibilities were for other than analytic training as such.

Columbia-Presbyterian Medical Center and the Psychoanalytic Clinic.—The Columbia-Presbyterian Medical Center, founded 25 years ago, consisted of a group of voluntary hospitals which elected to come together with the College of Physicians and Surgeons, Columbia University. Included in this group was also a single state-supported institution —the New York State Psychiatric Institute. The various psychiatric groups collected together in the new arrangement included, in addition to those at Psychiatric Institute, the Vanderbilt Psychiatric Clinic, the group of neuropsychiatrists at the Neurological Institute and at the Babies Hospital. Over the years the various autonomous units amalgamated but now operate as a single operational unit under the Department of Psychiatry of the College. Old sentiments still persisted in the hospital groups, and

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these attitudes still influenced certain decisions at the Medical Center. Psychoanalytic concepts were introduced early into the functioning of the Vanderbilt Clinic by Dr. A. A. Brill and later into the instruction at the Psychiatric Institute.

Negotiations for the development of a psychoanalytic institute under the aegis of the College of Physicians and Surgeons were commenced in 1942 through the activity of Doctors Nolan D. C. Lewis, George E. Daniels, and Sandor Rado. The matter was discussed with Dean Willard Rappleye and the Committee on Administration of the College of Physicians and Surgeons. Eventually arrangements were made for the granting of a certificate in Psychoanalytic Medicine from the College of Physicians and Surgeons, Columbia University, through the Columbia Psychoanalytic Clinic. It was agreed that psychoanalytic candidates who wished could apply and be individually examined for the degree of Doctor of Medical Science. The practice of granting a certificate has determined in large part the use by the Clinic of the examination system. The official recognition of the Psychoanalytic Clinic by the administrative organization of the University has contributed much to the stability of the Clinic.

The historical beginning of the Psychoanalytic Clinic came in 1944, when space was provided in the New York State Psychiatric Institute. The Psychoanalytic Clinic thus was organized under the College of Physicians and Surgeons and carried out its teaching activities in collaboration with the teaching and research institute of the New York State Department of Mental Hygiene. The initial financial support came from a Hofheimer Foundation Grant, which was later augmented by a grant from the United States Public Health Service. The grants now have been terminated.

Administrative structure.—Faculty appointments to the Psychoanalytic Clinic are made through recommendation of the Director of the Clinic to the Chairman of the Department of Psychiatry, and are discussed at meetings of the Executive Committee of the Department. An academic appointment in the department depends on supportive evidence of creative teaching and investigative work and not on training in psychoanalysis alone. Recommendations for appointments are accompanied by a curriculum vitae and a bibliography. In addition to the faculty psychoanalysts who hold academic appointments, there are associate psychoanalysts attached to the Clinic who contribute to the didactic, personal analytic, and supervisory work of candidates.

Appointment of the Director of the Psychoanalytic Clinic is made by the Chairman of the Department of Psychiatry. Up to the present time the succeeding directorship has been made on the basis of seniority and talent, and after discussion with the Dean of the College of Physicians and Surgeons and other department heads. Question has been raised whether the appointment to this position should not be conducted in a similar way to that of appointment of other senior positions in the University, that is, by recommendation of an appointment committee who would attempt to find the best qualified person available at large.

The internal Clinic organizational structure presently consists of an Executive Committee. The present Director has proposed the establishment of a series of subcommittees making the Psychoanalytic Clinic organization in many respects similar to that of other psychoanalytic institutes. The subcommittees are: (*a*) Curriculum; (*b*) Professional Standards and Selection of Candidates; (*c*) Student Advisory; (*d*) Clinical Teaching; (*e*) Clinical Services; (*f*) Child Therapy; (*g*) Research; (*h*) Fund Raising; and (*i*) Relations with the Psychiatric Institute.

Finances.—The current financing of the clinic derives from tuition fees, fees charged patients in the low-cost clinic (ranging from $1.00 or less to ten dollars per session) and salaries paid to faculty members from the Department of Psychiatry, College of Physicians and Surgeons. The administration of all funds for the Psychoanalytic Clinic is now carried through the office

of the Dean of the College of Physicians and Surgeons.

Modification of the program.—Originally the Psychoanalytic Clinic was organized as a 3-year program in which residency training in psychiatry was conducted simultaneously with the school work. The balance of experience for the first two years was spent in inpatient service in a psychiatric hospital acceptable to the Clinic (10). In this way, graduate students could enter the training school after medical internship. Courses were given in basic sciences allied with psychiatry, including psychology, genetics, neuropharmacology, and neurophysiology, as well as lectures in general psychiatry. It had been found advisable, however, to lengthen the course to four years.

The modifications in the educational program of the Psychoanalytic Clinic, particularly as they relate to the delegation of the basic science courses to the psychiatric residency training program at the Columbia-Presbyterian Medical Center and the decision to delay application to the Psychoanalytic Clinic until the completion of at least one year of residency training, were arrived at after much thought and consideration.

The first director of the Psychoanalytic Clinic advised that almost no candidates were able to complete the originally designed three-year course of instruction which incorporated psychoanalytic training with psychiatric residency training. The staff attached to the New York State Psychiatric Institute were of the opinion that the participants in the program failed to gain an adequate knowledge of general psychiatry. A time analysis of the scheduled hours between those who entered the original training program and those psychiatric residents who did not do so showed that the former were scheduled up to 60–70 hours per week against some 40–50 hours for the latter. There was, thus, little time for spontaneous study, investigation, or reading. In addition, the alumni of the Clinic reported that they had often gone elsewhere to fill in gaps in training which they discovered in the accelerated program.

Under the new training program the resident is exposed to a variety of experience in a number of clinical settings during his first year of carefully supervised psychiatric residency so that he obtains a wide perspective of the general field of psychiatry. If he applies and is accepted by the Psychoanalytic Clinic, he is not overscheduled owing to the lengthening of the training period. The original basic science courses may be taken during the first year of residency training, as they are no longer required by the Clinic but remain a part of the Postgraduate Course in Neurology and Psychiatry, Department of Psychiatry. An applicant accepted by the Psychoanalytic Clinic also may be relieved of other courses of formal instruction when evidence is available that he has become acquainted with the material presented in the course through other recognized instructional periods conducted at other institutions.

The educational program of the Psychoanalytic Clinic has been so organized as to make possible the positive growth of psychoanalytic thought in an academic atmosphere. The Clinic was founded on a set of principles which are intended to promote such growth and to offset recognized weaknesses in previous programs of psychoanalytic training (12). As stated in the Bulletin of the Columbia University Psychoanalytic Clinic (1), the teaching of psychoanalytic principles is carried out within an adaptational frame of reference. The phenomena of behavior are studied as adaptive processes of the human organism, both to his inner and outer environment. The training includes an evolutionary approach to human adaptation, a survey of the organic substrata of behavior, the relation of adaptational failure and stress to bodily disease, the cultural determinants of behavior, and a concept of mental health. The highest emphasis falls on psychodynamics, the laws of adaptation, the vicissitudes of adaptation under various forms of stress, and on the known methods of modifying disordered adaptation.

Curriculum.—The details of the curriculum of the Psychoanalytic Clinic for Training and Research are given in the Columbia University Bulletin of Information. The didactic courses cover the material required by the minimal standards of the American Psychoanalytic Association, with an added emphasis on comprehensive medicine (psychosomatics), reparative (brief) psychotherapy, the cultural factor in behavior, and clinical work with child patients. The curriculum is so organized as to foster the coordination of teaching in these various fields. The courses of instruction in the Psychoanalytic Clinic divide themselves into three groups:

1. Specific courses in psychoanalytic theory and clinical practice;
2. Courses in the basic sciences;
3. Elective courses.

The specific courses in psychoanalytic theory and clinical practice are the following:

1. Freud's classical psychodynamics.
2. The history of psychoanalytic therapy.
3. The psychoanalytic theory of adaptation, normal and pathological.
4. General principles of psychoanalytic therapy.
5. Technique of dream interpretation.
6. Advanced psychoanalytic technique.
7. Modified psychoanalytic technique in psychoses.
8. Developmental trends in psychoanalysis.
9. Interview technique with case demonstrations.
10. Reparative psychotherapy (brief psychotherapy).
11. The psychotherapy of medical patients.
12. The psychoanalytic study of children.
13. Current literature in psychoanalysis.
14. Research trends in psychoanalytic medicine.
15. Clinical conferences for both adult and child patients.

Psychoanalysis of psychoneurotic patients, under weekly supervision, is the core of the candidates' training, and the required personal analysis of the candidates is a cardinal and generally accepted requirement of preparation for the specialty.

The required courses in basic science are:

1. The integrative process in psychoses.
2. Analysis of behavior and methodology.

Elective courses vary somewhat from year to year. At the present these courses are:

1. Seminar in psychodynamics.
2. Research in psychoanalytic medicine.

Clinical foundations of training.—All aspects of training in psychoanalytic theory and practice are grounded in clinical experience. It is for this reason that the Columbia Psychoanalytic Clinic was established as a day school rather than as an evening course, as are the programs of instruction in the independent psychoanalytic institutes. Graduate training in daytime hours provides opportunity for a close integration of theoretical teaching and actual clinical experience.

The candidates' clinical experience, as already mentioned, consists of work with patients in reconstructive therapy. In addition, there are three services to which the candidate is assigned, in which he is required to treat patients by means of psychoanalytically oriented brief psychotherapy. A candidate is required to treat neurotic or borderline psychotic cases, amenable to psychotherapy, while on the Reparative Service; while on the Service for Medical Patients (Psychosomatic) he treats patients who have medical conditions where emotional factors are of primary interest. He is also assigned to work on the Children's Service.

Since January, 1946, a total of 1,448 patients have been treated by the candidates, under supervision of the Clinic staff. Of these, 541 were in reconstructive therapy, 446 in reparative therapy, 422 were treated in the Service for Medical Patients. The Children's Service is a newly organized one, and so far 39 patients have been seen.

The largest percentage of referrals to the treatment clinic comes from physicians, many of whom are on staff at the Columbia-Presbyterian Medical Center. The second

largest category are self-referrals. These include applications which state that the applicant has heard about the clinic from a friend. Agency referrals from hospitals, other psychiatric and psychoanalytic clinics and social agencies follow closely in number.

Most applicants come from professional and white-collar workers, with students the next largest group applying. More women than men apply for treatment. Of our applicants, the largest proportion are between 21 and 30 years of age; the 31–40 age group is the next largest. The proportion of unmarried applicants is slightly higher than the married.

Extension teaching.—The Psychoanalytic Clinic early developed a teaching program at one of the large state hospitals where our candidates served as residents. Subsequently, intramural supervision of residents at the Psychiatric Institute (14) was added as a training function. This program then expanded, at the request of the New York State Department of Mental Hygiene through the Director of the Psychiatric Institute, to include two more state hospitals in a fifty-mile radius of New York City where recent graduates of the Clinic attend weekly to instruct in interviewing, psychodynamics and psychotherapeutic procedures for a two-year program. Salaries are paid by the Department of Mental Hygiene. A third year, providing a variety of clinical experience and advanced training, was recently organized by the New York State Department of Mental Hygiene and the Department of Psychiatry at Columbia with the collaboration of the Psychoanalytic Clinic. It operates at the New York Psychiatric Institute and Vanderbilt Clinic of the Medical Center for a full day's instruction, including work with children. In addition to the hospitals mentioned above, this course draws senior residents from two additional state hospitals. Instruction is also furnished at Columbia for residents of an affiliated Veterans Hospital by Clinic instructors.

These activities serve Clinic graduates as important training experience as teachers in the various divisions of the Department of Psychiatry, including the Psychoanalytic Clinic.

Research.—In the two decades preceding the establishment of the Psychoanalytic Clinic, the senior faculty of the Clinic had been engaged in investigations that were to insure a broad scientific foundation for the program of instruction. The viewpoints which had thus been developed were later to prove peculiarly suited for university participation.

Drs. Sandor Rado, Abram Kardiner, and David M. Levy were each, through their special interests, arriving at a concept of psychoanalysis which was both more flexible and more attuned to modern scientific thought, yet based firmly on Freud's basic principles. To mention a few of many examples, Dr. Rado had been evolving a system of adaptational psychodynamics with its evolutionary hierarchy of emotions paralleling the development of the nervous system and, through the inspiration of Cannon's classical work on bodily changes under stress, elaborated his concept of the emergency emotions (11). Dr. Kardiner, in collaboration with a distinguished group of anthropologists at Columbia University, was re-examining by psychoanalytic methods the origins of cultural institutions. As a result of this study he challenged the universality of certain psychoanalytic cultural assumptions and re-emphasized the importance of cultural conditioning for analytic theory and practice (7). Dr. David Levy was applying psychoanalytic principles to child development and treatment of children, broadening the field by making original observations on animal behavior (8, 9).

As the most progressive centers attest, the development of modern psychosomatic medicine was made possible by the work of Walter Cannon and the psychoanalytic principles of Freud. Daniels had the opportunity during the early thirties to be part of a ferment of discovery taking place at the Presbyterian Hospital. At this time George Draper first established his Constitution Clinic (4) with its psychological panel, and Dunbar wrote her book on "Emo-

tions and Bodily Changes" (5). This laid the foundation for the *Journal of Psychosomatic Medicine*. Individual analysts and teams of investigators in this Medical Center went about systematically investigating peptic ulcer, ulcerative colitis, hypertension and coronary disease, diabetes mellitus, Graves disease, and the psychodynamics of sexual hormone functioning. This more individualistic period led to consolidation into a unified service of psychoanalytic investigators assigned to the Department of Medicine and acting as consultants throughout the hospital. A fourth fund of analytic knowledge and experience had thus been accumulating which was assembled to form a part of the new curriculum (3). As such it also served as an important bridgehead to the medical school and general hospital. Of interest in this connection, the first designation of the new school was The Psychoanalytic and Psychosomatic Clinic for Training and Research. Following its establishment the Clinic continued research on various fronts, many of which are summarized in the proceedings of the Decennial Celebration in March, 1955 (12).

It is the present policy of the faculty of the Psychoanalytic Clinic to encourage candidates to pursue specific research interests under the supervision of faculty members. Such research undertakings are organized and carried through by faculty members with the assistance of the candidates who show interest and competence in this direction. Individual initiative in candidates' research is also encouraged. There is a rich opportunity for steady expansion of such activity in the organization of the Psychoanalytic Clinic, in its integration with the Department of Psychiatry, the Medical School, and the Columbia-Presbyterian Medical Center. During the past year fourteen of the candidates spent free time participating in research assignments in the Department of Psychiatry at the Psychiatric Institute and at the Presbyterian Hospital and in other related departments.

Aid to candidates in training.—The Psychoanalytic Clinic, from its inception, has sought to make the candidates' experience conform with academic practice. Because the expenses of psychoanalytic training are considerable, the Psychoanalytic Clinic has recently experimented with further ways of lightening the students' financial burden. It was considered that the general practice of arranging student fees individually with personal and supervisory analysts was inappropriate in a university setting where all students are provided fixed rates for tuition and other expenses. A further consideration, that of the student's identification with training analysts who were perceived as motivated essentially through material gains, led to the establishment of a new way of arranging the student experience with the cost of his training. This represents a deviation from the practices of the non-university psychoanalytic institutes.

Beginning with the class entering training July 1, 1956, a standard fee of $15 a session was set as the maximum fee that could be charged per session for the personal analysis of candidates. For the students who are planning to undertake full-time academic work, clinical teaching, or research, further provision has been made. The experiment of fellowship aid paid directly to the training or personal analyst to cover the cost was made for one student. This was also a great help timewise, as he was analyzed at the Medical Center. Another aid for those interested in full-time academic work was instituted in the fall of 1957. It consisted of grants to cover tuition. Three such scholarships were given. Arrangements were also made so that other institutions might make such grants available to support training of its faculty who receive instruction at the Clinic.

The faculty remains eager to continue its aim of increasing the available time and usefulness of its teachers, working toward the establishment of some key full-time and half-time staff members. To insure the training of graduates who are not only sound practitioners but of caliber for academic posts as well, the development of more general fellowships is projected for men in-

terested in such careers.

Effectiveness of program for academic psychiatry.—The importance of bringing together knowledge of psychoanalytic concepts and techniques with that of psychiatry practiced in a medical setting as a means of training psychiatrists and psychiatric teachers is reflected in the current activities of the graduates of the first university-sponsored and organized psychoanalytic institute. Of the 108 graduates in its twelve years of existence, 4 are now professors and chairmen of departments of psychiatry, 85 hold academic appointments in schools of medicine, 72 teach psychodynamics and psychoanalytic theories to the residents of university or state mental hospitals or other federal institutions (Veterans Administration or U.S. Public Health Service Hospitals), and 57 are engaged in investigation. A candidate, approaching graduation, has been appointed also as a departmental chairman.

The range of the investigative work demonstrates the welding influence of the basic sciences upon psychoanalysis thus enriching both branches of medical science. Such welding and mutual questioning may occur only in a medical setting. One may mention studies with candidate participation of the genetic, biochemical, psychodynamic, and psychogenetic influences determining divergent homosexual and heterosexual development of identical twins; longitudinal studies of children of schizophrenic parents from birth including neurophysiological studies, family interaction and psychological growth and genetic evaluation undertaken with the cooperation of the Departments of Pediatrics, Obstetrics and Genetics; psychodynamic and epidemiological approach to the treatment and rehabilitation of narcotic addicts, with the Department of Public Health; and interdisciplinary studies (sociological, psychodynamic, and biometric) of relationship patterns in adolescent schizophrenics on a psychiatric ward.

The teaching of medical students and psychiatric residents by the College and the affiliated hospitals of the New York State Psychiatric Institute and Presbyterian Hospital has been enriched and fertilized over the years by the appointment of young graduates of the Clinic broadly trained in both general psychiatry and psychoanalysis. The success of their contribution, made with the activities of the senior departmental faculty, is attested in the increasing number of medical students of the College who have elected psychiatry as their future specialty and the continued large demand for the psychiatric residency positions at the Medical Center, associated with an evident rising quality in the academic abilities of the applicants for such training.

Summary.—In this communication we have attempted to share our experience in the development of a psychoanalytic training unit established within a university medical school and its department of psychiatry. The advantages to the candidate of daylight hours of instruction for receptivity and clinical experience seem obvious. In turn, its low-cost teaching clinics have made a significant contribution to the mental health of the community through the availability of analytic therapy. We have attempted to portray the leavening and quickening effect of a psychoanalytic institute on a medical school, the university general, and associated psychiatric hospitals and services. This influence has acted through its teaching of modern psychodynamic theory and practice at all levels of instruction, and has been extended further by the action of its graduates in peripheral hospitals, state and otherwise, as well as in other universities and medical schools.

REFERENCES

1. Columbia University Bulletin, The Psychoanalytic Clinic for Training and Research. Fifty-ninth Series, No. 25, June 20, 1959.
2. Committee on Medical Education of the American Psychiatric Assoc., Theodore Lidz, M.D., chm. An Outline for a Curriculum for Teaching Psychiatry in Medical Schools. J. M. Educ., 31:115–28, 1956.
3. DANIELS, G. E. Graduate Training in

Psychosomatic Medicine. Menninger Clinic Bull., Vol. 9, No. 2, 1945.

4. DRAPER, G., and MCGRAW, R. B. Studies in Human Constitution. V. The Psychological Panel. Am. J. M. Sciences, Vol. clxxxiv, 1927.
5. DUNBAR, H. F. Emotions and Bodily Changes: a Survey of Literature on Psychosomatic Interrelationships, 1910–1933. New York: Columbia Univ. Press, 1935.
6. DWYER, T. F., and ZINBERG, N. Psychiatry for Medical School Instructors. J. M. Educ., 32:331–37, 1957.
7. KARDINER, A. The Individual and His Society. New York: Columbia Univ. Press, 1935.
8. LEVY, D. A Note on Pecking of Chickens. Psa. Quart., 4:612–13, 1935.
9. ———. Maternal Over-Protection. New York: Columbia Univ. Press, 1943.
10. RADO, S. Graduate Residency Training in Psychoanalytic Medicine. Am. J. Psychiatry, 105:111–15, 1948.
11. ———. Psychoanalysis of Behavior, p. 214. New York: Grune & Stratton, 1956.
12. RADO, S., and DANIELS, G. E. Changing Concepts of Psychoanalytic Medicine. New York: Grune & Stratton, 1956.
13. SILVERMAN, S. Teaching Psychoanalytic Psychiatry to Medical Residents. J. M. Educ., 31:436–43, 1956.
14. WEBER, J. J. Some Observations on Psychiatric Residency Supervision. Psa. Rev., 43:214–19, 1956.

New Teaching Vistas in Roentgenology

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Ready for routine use in roentgenology are the disciplines of television and cineradiography. The problem of dealing with diminishing availability of patients for teaching purposes can now be effectively approached with these new roentgenologic techniques. At the same time, the teacher can reach audiences of any size, in single or multiple locations; and he can address them simultaneously or at different times from telerecorded magnetic tapes.

As far back as 1936, Dessauer (3) in Germany predicted that the day would come when the radiologist no longer would scrutinize with dark-adapted eyes a very weakly luminescent screen; moreover, he would view the fluoroscopic image in any desired size from his desk, as brilliantly as he pleases in broad daylight; and that this would come to pass with progress in the art of television and cineradiography. Morgan (10) and Chamberlain (2) in America did much to foster this idea. Their work further expanded the notions of the French inventors, Belot and Dauvilliers (1), who experimented with an image intensifier. The principles of x-ray television thus were established, and Moon's modern method (7) of using a scanning x-ray tube for x-ray intensification is an extension of these early principles.

Realization of the necessity to restrict irradiation to a minimum, at the same time gaining the benefits of increased perceptibility of detail, has greatly accelerated the use of image amplifiers; and in turn, this has made possible the practical use of cineradiography.

Some confusion still persists in the conception of applying television techniques to roentgenography, but this discipline is advancing *pari passu* with cineradiography. Sturm and Morgan (10) and Janker (5) used an image orthicon for direct television pick-up from the fluorescent screen, but the interpositioning of an image amplifier proved to be superior, especially when considering radiation dosage to the patient. A commercial unit already is available which combines an image intensifier with a vidicon camera, and this combination accomplishes a 50 per cent reduction of irradiation to the patient without marked loss in image quality. From actual clinical trials, it is now obvious that x-ray television will become a generally accepted method of x-ray examination.

Of course, improvements in apparatus will continue to appear, such as a further decrease in the visible "noise" caused by the combination of amplifier and television; a decrease in the after-glow present after movement of x-ray tube or screen; and an increase of automation for continuous readjustment of image brightness and contrast enhancement (8).

Finally, in the near future, we can expect the introduction of telerecording and the use of memory devices. At the recent Ninth International Congress of Radiology in Munich, magnetic tape on a fly-wheel for recording single scanning periods was demonstrated, as well as the use of an American memory tube which shall, in the future, make possible sharp reduction in radiation exposures to patient and physician. Jutras

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and Duchett (6) of Montreal are already employing all these devices routinely. They study the patient on a table which can be rotated 360°, and, in addition, table top and patient can be moved in caudal, cranial, or lateral directions without tugging the patient or disturbing themselves. The x-ray tube is in a fixed position over the table top, and a compression cone is movable from the tube toward the patient. Two 5-inch image amplifiers can be put alternately into position below the table, one equipped with a vidicon pick-up for television monitoring and the other with a 16-mm. cine camera for cineradiography. All the movements of the patient, compression cone, cine unit and television set are remotely controlled so that the radiologist is in another room, away from all ionizing radiation. The patient, of course, is examined in full daylight, and the spot-film cineradiography results in better exposition of physiologic disturbances as well as pathological changes.

In congenital heart disease, to see the direction and location of shunts, to visualize abnormal pressures in the pulmonary vascular tree, to observe the amounts of air flowing through the broncho-pulmonary system, whether uniform or locally disturbed; to study vascular dynamics in all parts of the brain and body, to visualize the motor activity of the gastro-intestinal, biliary, and the genito-urinary systems mean that roentgenologists will not only play a greater part in the teaching of anatomy, but also assume a new role in the study of normal and deranged physiology.

Rigler recently in his 1958 Caldwell lecture to the American Roentgen Ray Society (9) emphasized this trend of the radiologist to become more preoccupied with physiologic rather than morphologic irregularities. He eloquently summed up by saying "... here is a challenge; the study of the roentgenogram in terms of physiology, in terms of a living process." And now with television and cineradiography, his remarks take on a new cogency.

The radiologist thus is now ready to detect and record signs of physiologic disturbances leading to aging processes, degenerative diseases, and other chronic diseases before they become clinically evident. He will proceed with greater safety to himself and to the patient. Remembering that he will be examining the patient by remote control, he will demonstrate his findings during examination to colleagues not in the presence of the patient; or he can telerecord his findings for demonstration in another institution, city, or country via television circuits—or to one or more classes of students in his or other colleges. As a teacher, no longer will he be handicapped with the increasing dearth of teaching material. Private patients can be examined with no inconvenience or embarrassment. Finally, as a fillip, visual access to the physiological activity of various organs and systems of the body on television and movie film will be in color—an experimental approach already successfully accomplished (4).

REFERENCES

1. BELOT, J., and DAUVILLIERS, L. Dispositifs d'utilisation de l'ampoule à 600 kv., de l'institut du cancer de la Faculte de medecine de Paris. Mesure de rayonnement, Bull. et mem. Soc. d'electro-radiol. med. de France, **27**: 62–69, 1939.
2. CHAMBERLAIN, W. E. Fluoroscopes and Fluoroscopy. Radiology, **38**: 383–414, 1942.
3. DESSAUER, F. Uber Kinematographie mit Rontgenstrahlen. Fortschr. a. d. Geb. d. Rontgenstrahlen, **56**: 126–31, 1937.
4. FISHER, J. F., and GERSHON-COHEN, J. Television Techniques for Contrast Enhancement and Color Translation of Roentgenograms. Am. J. Roentgenol., Rad. Ther. & Nuc. Med., **79**: 342–47, 1958.
5. JANKER, R. Apparatus for Fluorography on 35 mm. Film. Fortschr. a. d. Geb. d. Rontgenstrahlen, **58**: 588–93, 1938.
6. JUTRAS, A., and DUCKETT, G. Video-Roentgendiagnosis. Ninth International Congress of Radiology, Munich, Germany, July, 1959.

7. MOON, R. J. Amplifying and Intensifying the Fluoroscopic Image by Means of a Scanning X-ray Tube. Science, **112** : 389–95, 1950.
8. MORGAN, R. H., and STURM, R. E. An Automatic Regulator for Providing Constant Brightness of the Fluoroscopic Screen. Am. J. Roentgenol., Rad. Ther. & Nuc. Med., **71** : 110–14, 1954.
9. RIGLER, L. G. Functional Roentgen Diagnosis: Anatomical Image-Physiological Interpretation. Caldwell Lecture, 1958. Am. J. Roentgenol., Rad. Ther. & Nuc. Med., **82** : 1–24, July, 1959.
10. STURM, R. E., and MORGAN, R. H. Screen Intensification Systems and Their Limitations. Am. J. Roentgenol., Rad. Ther., **62** : 617–34, 1949.

An Experiment in Faculty Self-Evaluation*

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In the history of faculties of many medical schools, there appear to be intervals characterized by confusion of objectives, lack of understanding of common problems, and complacency. This phenomenon is not unique to medical schools. It may occur in the natural history of any organization. Industry and government have recognized that these periods can often be prevented by a periodic review of their objectives, policies, and functions. Such reviews are essential to assure well balanced programs and objectives consistent with the changing needs of society. In educational institutions periodic evaluation cannot be carried out successfully by boards of trustees, administrative heads, or committees alone. It is our belief that the faculty itself should participate actively in the development of academic objectives, policies, and programs.

The Bowman Gray School of Medicine of Wake Forest College was established as a 4-year school in 1941. In 1956, the administration of the medical school recognized the need for a critical and comprehensive evaluation by the faculty of our programs in education, research, and patient care. It was felt that the process of self-evaluation would help to avoid a period of complacency and divided direction and would serve also as a valuable re-orientation for the faculty and as a guide for planning future development. From the onset, it was decided that major attention should be focused on the ecology of the faculty; that is, the identification and analysis of all factors in the medical school environment which effect the academic development and achievement of the faculty as individuals and as a group. The study was limited primarily to the full-time faculty, and the approach involved maximum participation by this group. The purpose of this paper is to describe the plan of this experiment and reaction of the faculty.

The first phase began in 1956. Extensive information was collected on the organization, policies, and finances of the school and on the growth, activities, and contributions of the faculty since 1941. A detailed survey was then made of the academic and professional activities and total load of the faculty for the year 1955–1956. Though the entire staff aided in the collection of this information, the data were reported in terms of the basic academic unit—a department or section. As such, the individual faculty member remained anonymous. An example of the type of information obtained from this survey is shown in Chart 1. In order to have a suitable basis for the comparison of different academic units, estimates of time spent in various functions were translated into full-time faculty equivalents. One full-time equivalent was defined arbitrarily as 8 hours a day available for academic work, 270 days a year. Recognizing that all types of teaching do not require the same amount of preparation and effort, a weighting system for scheduled teaching

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hours was adopted which reflected the average preparation time for the various types of instructional methods in use. On the chart, the space between the top of each column and the "full-time load limit" indicates time available for research, personal study, and extra-mural academic activities. Areas of imbalance and overload are clearly identified.

In 1957 a committee of six faculty members was appointed to evaluate this information and to prepare a report for study by the entire faculty prior to a workshop type of conference for this group away from the institution. This report, of almost 100 pages, presented extensive data on the past history and present status of the medical school in graphic form, with the results of committee analysis. This was followed by recommendations of optimal conditions, including policies under which the faculty should be expected to carry out its academic responsibilities and develop its maximum potential. Committee opinion was briefly summarized in the form of policy guide lines for the future development of the medical school.

A 3-day conference was held at the Hotel Roanoke, Roanoke, Virginia, in June, 1958. Over 90 per cent of the full-time faculty attended. The President of Wake Forest College, the Dean of the College of Liberal Arts, and Dr. Stanley W. Olsen, Dean of the Baylor College of Medicine, served as resource persons for the conference.

The stated objective of the conference was to provide an opportunity for the faculty to discuss freely and frankly with each other the development of the medical school, the responsibility of the institution in the future, and the kind of environment in which the faculty member can develop his maximum potential and best meet his academic responsibilities. These areas were discussed within the framework of four major topics:

1. "Major Trends in the Development of the Medical School since 1941—Cause and Effect."

2. "The Faculty as a Group." This topic included areas such as definition of the faculty, relationship between the faculty and the administration, communications, faculty compensation, future development of the faculty as a whole, e.g., recruitment, the full-time question, priorities in the use of academic funds, etc.

3. "The Faculty Member as an Individual." This topic included subjects such as policies for appointments, promotions, tenure, and retirement; definition of optimal academic load; minimum academic requirements; and methods of stimulating high quality academic performance.

4. The last topic summarized these discussions and was entitled "Policy Guide Lines for the Future Development of the Medical School."

There is no question in our institution that this conference was highly successful. The credit for this is given largely to detailed meticulous preparation for the undertaking. Two major factors stand out. First, the creation of a purposeful and business-like atmosphere is very important to the success of a faculty conference held away from home. Second, and of equal importance, is thorough preparation of the entire group for this intensive period of self-study. In our institution, this preparation began 5 months before the conference with an announcement of the dates and a statement of the background and objectives of the meeting. Two months later a second memorandom was issued describing the workshop technique and outlining the four major topics to be discussed. The faculty was asked at this time to submit questions and comments on areas of special interest related to these topics. One month prior to the conference a third memorandum was issued giving information regarding transportation, the hotel, and related subjects. The final memorandum was sent out 10 days before the meeting and included a copy of the report of the study committee; a list of participants, guests, and discussion group assignments; a detailed description of the role of group chairmen, recorders, and resource persons; and a final conference schedule. Distribution of the study committee report was delayed purposely until this time. Ten days allowed an adequate period for

individual study and also greatly limited pre-conference discussion of the report on an informal basis.

The workshop technique used at the conference is generally known, and details will not be discussed here, other than to state that the composition of each discussion group included representatives from basic medical science and clinical departments. These assignments, including those of chairman and recorder, were rotated at each of the four group sessions. During the 3 days, 40 different members of the faculty served either as a chairman or recorder of a discussion group. Summaries of the proceedings of each discussion group were mimeographed promptly and distributed to all participants during the conference period.

Three issues seemed to attract greatest attention. First, methods for improving communications within and between departments; second, definition of what is expected from a faculty member and how his performance is to be judged; and third, relationships between the faculty and the administration. Surprisingly little emphasis was given to areas directly related to the security of the individual faculty member, such as compensation and retirement. Instead, it was apparent that the primary concern of the faculty was related to security for the institution.

A questionnaire was circulated at the close of the meeting, and participants were asked to indicate what they liked and to comment on how a conference of this type could be improved. Opinion was unanimous that the objective of free and frank discussion had been achieved and that similar conferences would be valuable in the evaluation of other areas such as curriculum and problems related to students. Some of the most frequently repeated comments can be summarized as follows: The conference gave everyone an opportunity for frank airing of opinions which led to a better understanding of mutual objectives and goals. It gave the participants the opportunity to learn problems of others and discuss their own, and also to gain a better understanding of the organization and development of the medical school. The opportunity to become better acquainted with one another and to discuss problems with representatives from the college and the dean of another medical school were rated highly in the comments. The group as a whole was surprised and pleased with the seriousness of purpose and conscientiousness of the participants and the evident *esprit de corps* among the faculty. There were relatively few suggestions for improvement, and most of these revolved around the well recognized fact that practice in the workshop technique leads to the most effective use of this method. Many persons indicated an interest in having more people attend the conference, representing outside points of view. It was apparent that many faculty members have had a minimum exposure to changes and experiments that are occurring throughout the country in medical education. Everyone receives a small amount of information through his own specialty group at meetings, but rarely is he afforded an opportunity to participate in discussions of over-all concepts of medical education with visiting educators and administrators.

There is little doubt that this experiment created a healthy ferment among the faculty. This can be a constructive reaction. Much depends on administrative leadership following the period of intensive self-study. In our institution steps were taken to put certain conference recommendations into effect immediately. Others are being translated into specific plans or policies to be implemented in a priority manner as resources permit. The reaction of the faculty was determined to some extent by the subject chosen for study. On the other hand, it is our belief that the method used was of much greater importance.

In summary, it can be stated that opinion was unanimous that this experiment in critical self-analysis was a valuable and needed re-orientation for every individual involved; it exposed drifts and trends, both good and bad, within the institution, and it has formed the basis for sound planning for the future development of our medical school.

The Role of a Children's Psychiatric Clinic in the Teaching of Psychiatry

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Introduction.—This paper reports the experience at the University of Michigan in using the clinical situation of a children's out-patient psychiatric clinic as part of the training in psychiatry for senior medical students. The Department of Psychiatry at the University of Michigan Medical School is fortunate in having an active child psychiatry service with a busy out-patient clinic, a residential treatment center, and a staff of sufficient size to make this form of teaching feasible. While the students at the University of Michigan have had direct experience in child psychiatry for a number of years, this paper reports on our present technique in teaching which has gradually evolved and has existed in its current form for about 2½ years.

Purposes.—While it is not the purpose or intention of the medical school to train specialists in any field, particularly, one as "super-specialized" as child psychiatry, it is our feeling that this is an area of clinical psychiatry that is too often neglected in the medical students' preparation (3). We recognize that almost any practicing physician, regardless of his specialty, is likely to see children and, therefore, children with emotional problems. Also, many physicians, particularly general practitioners, pediatricians, and internists, functioning in the role of family physician, will invariably be called upon to advise parents concerning child rearing practices and management problems. Therefore, we felt that some competence in recognizing and dealing with the more common emotional disturbances in childhood was appropriate.

Certainly, other conceivable benefits could derive from the child psychiatry experiences, although these were secondary to our primary goal. The children's psychiatric clinic happens to be as close an approach to a family medical setting as exists in our University Medical Center. It has been traditional in child psychiatry and in child guidance clinics to approach problems with emphasis on family rather than patient. We felt that an experience in such a clinic would give the students first-hand contact with the impact of inter-family and social influences on the lives of individual family members. It also gave the student practice in functioning as the "physician counsellor" to a family in relation to specific family problems. We also anticipated that the student would be able to learn new skills in interviewing and history-taking techniques by work in such a clinical setting. An additional hope was for the student to obtain more experience and knowledge of normal growth and personality development and common variations from this.

Method.—The senior students at the University of Michigan have had experience in several areas which are directly pertinent to their work in the child psychiatry clinic before actually arriving for this experience. Normal growth and personality development have been presented both from the standpoint of the psychiatrist and the pe-

diatrician during earlier courses in those areas. During the junior year, the students attend some lectures and demonstrations covering common syndromes encountered in child psychiatry which are presented as variations in the normal development so that this constitutes some review of the principles of normal personality growth and development. All the students have previously had experience on the Pediatric Service, and, recently, a member of the child psychiatry staff has spent several afternoons a week in the Pediatric Department where he has had contact, as a consultant, both with the pediatric staff members and with students working in the pediatric clinic.

Small groups of the senior class, three or four at a time, are assigned in rotation to the children's psychiatric service. As the curriculum is presently arranged, they spend all day for 9 consecutive clinic days. The first 1½ hours of each morning are spent as participants in a discussion group with a similarly sized group of senior students simultaneously working in the Adult Out-Patient Department for an evaluation and comparison of their experiences on the two services. The first day in the children's psychiatric clinic is spent in orientation. The composition and roles of the clinic staff and team members are reviewed, the physical facilities are shown to the students, and they then spend the bulk of the day watching an evaluation of a child and his parents through a one-way window set-up. Early in the day they observe psychological testing of the child and, later, from the same room, watch a member of the social work staff interview the parents. Later, again using the same observation set-up, they watch a member of the senior psychiatric staff conduct an interview with the child. The students then participate in the team meeting of the psychiatric social worker, the psychologist, and the senior psychiatrist, which reviews the findings from each area and arrives at a tentative diagnostic formulation and makes recommendations. The students then observe while the senior psychiatrist interprets findings and makes recommendations to the parents. The fact that the psychiatrist is the team member who presents findings to the parents is in contrast to usual child guidance clinic practice where the social worker commonly fulfills this function. However, in our setting, with the emphasis on preparing the student for his future medical practice, we felt he must see first-hand the problem the physician encounters in this most crucial phase of the diagnostic process.

Following this one-day period of orientation and observation, the students then began direct work with new cases being seen in our clinic for evaluation. We have had some hesitancy about putting students directly into this complicated clinical situation without further preparation, but have found that direct experience in the setting is the best teacher.

The cases are selected for the students from patients being seen for the first time in our clinic. The only limitations we impose are that the case be a new one rather than one returning for re-evaluation, although occasional exceptions to this rule are made when the case seems particularly interesting and instructive. We also limit the students' contacts to those cases where at least one parent is available for interview. We have not encountered the resistance on the part of referring agencies or nonmedical clinic staff toward the utilization of medical students as part of the clinic team to the degree that others have reported (2). Perhaps this is explained by the fact that our staff has worked in a medical setting and has been intimately involved with the training of psychiatric residents for some time, so that the presence of medical students on the scene is not too great a transition.

Cases seen by the students have usually come for one previous visit, at which time a social worker has held an intake interview, and the child usually is seen for psychological testing. On the day of the appointment the students are introduced to the parents of the child by the social worker

who has briefed them, to a limited extent, about the reason for referral. The students divide themselves into groups, with two seeing the parents and the other two interviewing the child. Time is allotted for them to meet together and discuss among themselves their interviews. All aspects of the case, including the students' interviews, additional material available from referring agency, and reports from the psychologist and social workers are then reviewed and discussed with a member of the senior psychiatric staff. The senior psychiatrist will frequently want to see the parents himself for further diagnostic information and, in all events, will see them for interpretation and recommendation and will also examine the child in the presence of the students. Additional time is then allotted for summing up of findings and elaborations of questions that may have arisen.

Results.—From what has been described, it will seem apparent that the medical student has been immersed in a concentrated and at times overwhelming clinical experience, but one that is full of potential to the student's further growth and maturation. It has been particularly impressive and rewarding for us to see the student's increasing recognition of problems that can arise within a family group. We feel the student is especially benefited by this opportunity to work directly with the family, with ample opportunity for supervision and discussion of his work.

By far the most common problem that arises with the student is an old one in the teaching of psychiatry, namely, the student's anxiety about becoming emotionally involved with the patient. Usually, by the time the student has reached his senior year, he has begun to feel more comfortable and confident in dealing with clinical situations in the field of physical disease and, as many others have reported (1, 4), tends all too often to ignore the emotional implications of the doctor-patient relationship and to try to protect himself from further anxieties by restricting his field of interest and inquiry to those areas where he is more familiar and comfortable, namely, physical disease. A frequent outgrowth of this anxiety appears in the form of the student who is overly antagonistic toward psychiatry, psychological problems, people with psychological problems, and their very inclusion in the medical curriculum. These are the students who are most likely to become impatient with what they see as a lack of preciseness in psychiatric practice. This same difficulty is expressed in perhaps another way by the rather common finding of the students' inability to recognize obvious psychopathology and his great need to see gross disturbances in feeling or behavior as only minor variations from the normal.

Some of the problems we have encountered seem more nearly unique to the child psychiatry setting and run contrary to what others have reported in experience with students in a teaching program for adult psychiatry (1). It has been pointed out that by the time the student has reached his senior year he has developed some feeling of competence and adequacy about many areas of physical medicine but tends to look upon himself, when it comes to the area of psychiatry, as in a no better position than a somewhat enlightened or better educated layman. The opposite of this attitude is sometimes encountered in the child psychiatry clinic, since we find very often that anyone can view himself as an expert in what he chooses to see as correct child-rearing practices. This appears to be part of a broad cultural attitude which is quite similar and is undoubtedly fostered to some extent by attitudes prevalent in medical and pediatric circles and usually referred to as a "common sense" approach to behavior problems in children (5). The students have difficulty accepting deviant behavior as arising from anything other than inadequate discipline. The students tend to fluctuate between extremes of permissiveness and rigidity and often become quite involved emotionally with various family

members. We notice a marked tendency of the student to identify either with the parent of the same sex or with the child.

Since the medical student is frequently at an age where a large proportion are married and many are parents themselves, it becomes more difficult for them to make an objective evaluation of a given home situation. In the discussion that follows a case presentation, we commonly encounter students who bring up experiences in raising their own children or from their own childhood—with such remarks as, "Well, my kid does that all the time—it must be normal," usually followed by an anxious laugh.

We have certainly encouraged the inclusion of anecdotes from the student's personal experience as profitable topics for discussion and feel that we are sometimes successful in conveying our feelings that a parental attitude of maturity, flexibility, and warmth, accompanied by reasonable controls is a much more healthy situation than dwelling on a minutia of specific handling techniques for a variety of incidences. However, it should be kept in mind at all times while personal experiences are being discussed in such a setting that we are dealing with what is in fact as well as in name a teaching situation and should not, we feel, become a therapeutic one.

As one student summed it up, "the best way to get more out of the experience in the children's psychiatric clinic would be to have had more experience in a children's psychiatric clinic." We are certainly firmly convinced that there is no substitute for personal experience in the direct clinical situation. In this respect we recognize inadequacies in what we would consider a desirable optimum in the students' previous experience. The students arrive on the service with many glaring gaps in their knowledge and experience, foremost among which is an unfamiliarity with the normal. Another lack is an inability to recognize pertinent diagnostic and historical facts. The student in his training for a general medical practice is often long on theoretical formulations and short on direct practical experience in learning what to observe, how to make these observations, what significance to place upon them, and what to do about them. There is a lack of appreciation of the value of a longitudinal history as related to the understanding of previous adjustment and current problems that may be presenting.

Another unique advantage of the child psychiatry setting is that the student is almost forced to adopt a more passive and nondirective position during the interview rather than to turn it into a question and answer situation. Child psychiatry, which capitalizes on observing the child in a play situation and emphasizing nonverbal communications, can bring this home in a sometimes dramatic fashion. For instance, on one occasion the students greeted the senior psychiatrist by excitingly describing for 15 minutes the hyperactive, distractible behavior of a 5-year-old boy whom they called "a real Dennis the Menace." After they had finished their description of the child's behavior in the interview and were asked what they thought of him, they hastened to reply that they had been unable to form an opinion because the child would not answer any questions.

Similar problems arise in a student's contact with the parents. There is difficulty in deviating from the traditional role of the physician as a person who gives direct advice in a somewhat authoritarian manner. We find it particularly difficult for the students not to do this, especially when the parents specifically request a list of do's and don'ts.

Our general impression of the program so far has been satisfactory, although certainly many problems have presented themselves. We feel the experience is sufficiently worth while to justify its continuation as a part of the medical curriculum. It is anticipated that at a future time we will be able to compare the value of this experience with that of a group of students who did not work on the child psychiatry service.

REFERENCES

1. CARTER, G. H.; BANDLER, B.; and BAKST, H. L. Integration of Psychiatry. J. M. Educ., **28**: 21–25, 1953.
2. KAUFMAN, S. H., and RIPLEY, H. S. New Approach to Undergraduate Teaching of Psychiatric Problems of Children. J. M. Educ., **28**: 21–25, 1953.
3. LEWIS, M. D.; LOGAN, M.; and SULLIVAN, A. W. Experiment in Teaching Child Psychiatry to Fourth Year Medical Students. J. M. Educ., **31**: 295–302, 1956.
4. MARX, J. R., and JENKINS, W. C. Teaching of Pediatric Psychiatry in a Setting of Medical Clerkships. J. Assoc. Am. M. Coll., **25**: 323–29, 1950.
5. WORK, H. H. Exploring the Role of Psychiatry in Pediatric Education. Pediatrics, **16**: 408, 1955.

The Lecture: A Reconsideration

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In recent years there has been an increased interest in improving the methods of teaching psychiatry—especially in teaching the principles of dynamic psychiatry and psychopathology to students during their first 2 years of medical school. Attention has been focused on developing the use of small discussion groups and of student group therapy sessions. The lecture, although tolerated as a traditional form of teaching, has too frequently been treated like a poor relation —inevitably present at the family party, but assigned a seat at the foot of the table. There has been little interest in attempting to improve the effectiveness of this form of teaching. It is the purpose of this paper to suggest a method of presenting material in lectures which increases their usefulness in a teaching program and enables them to do what other types of teaching cannot.

There has been good reason for the increasing use of small group discussions and student group therapy sessions. Many medical students are bewildered and antagonized when first confronted with the ideas and concepts of dynamic psychiatry. This is not because learning the theoretical concepts particularly taxes one's intellectual capacities. It results, rather, from the fact that the students are generally not familiar with the observations which the theoretical concepts explain, and the theories remain only meaningless abstractions for them.

Most students come to medical school well grounded in the physical and biological sciences, with a common experience in observing external physical events and with a common orientation of taking these as the proper objects of scientific study. Most of them do not have a comparable experience with observing psychological events. To be asked suddenly to shift their attention from physical events and chemical reactions to feelings, fantasies, and impulses is hard for many of them, especially when they have not yet seen the clinical phenomena where these are relevant and important observations. As a consequence, the concepts and theories based on these observations have little meaning or value for them. It is obviously, therefore, of the utmost importance to confront the students with psychological phenomena in such a way that they will be forced to look at them, that they will be aroused to curiosity about them, and that they will accept them as worthy of study and see them as providing reasonable evidence for the theories devised to explain them.

It is just here that a difficulty arises. In other basic science courses, laboratory exercises, and classroom demonstrations and slides are closely coordinated with the lectures and give them substance and meaning. The phenomena of dynamic psychiatry, however, are to be seen most readily in patients; and usually, except in the most cursory way, the students have not had exposure to clinical material at the time when they are being taught the principles of psychodynamics or psychopathology. This is one of the main reasons why the use of small discussion groups or student group

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therapy sessions has been emphasized in current teaching practices. With these techniques the concern and puzzlement of the students can be handled in a more personal way, patients can be effectively interviewed and demonstrated before the groups, and the students may experience, through self-observation, some of the psychological phenomena at first hand.

There are, however, disadvantages in these modes of teaching: (*a*) Because many different instructors participate in small group discussions, the students are not presented, as an entire class, with the same material and instruction. (*b*) In group therapy sessions the subject matter cannot be presented in a systematic and logically unfolding manner. (*c*) Finally, owing to the hazards of human variation, the patients seen may not demonstrate the phenomena one wishes to observe.

A well planned series of lectures given as a course by one instructor can obviate the first two of these disadvantages, and the third can be removed by the proper presentation in the lectures of the basic clinical observations. This is not to imply that illustrative case material has not been ordinarily used in lecture series to exemplify the concepts being discussed. It has, however, generally been in the form of case histories, or fragments of case histories, told in discursive, second-hand narrative form, and as such loses much of the vitality and color of the original material as it comes from the patient himself.

There are two ways of avoiding this latter difficulty: (*a*) by using passages from autobiographical material written by those who have suffered from emotional disorders. The recently translated Schreber *Memoirs* (1), for example, provides a wealth of illustrations of schizophrenic thought disorder and disturbed perceptions. (*b*) The use of transcribed material from interviews recorded from patients has an even greater value. As with the pathologist's slide or photomicrograph, one can select for presentation the material that best exemplifies the concepts one is discussing. Furthermore, one can stop the reading of the verbatim material at any point to comment, to point to mechanisms, or to amplify the discussion in any way desired. The use of transcribed interviews provides much of the vividness of an interview with a live patient before the students, and gives the instructor far more control over his material than he has when the patient is actually present.

It is time to illustrate the procedures that have been proposed. In the following, obviously condensed verbatim material from a recorded interview with a patient with obsessive-compulsive neurosis, one can see how it is possible to demonstrate to the students the phenomenology of phobias, obsessions, and compulsions; their ego-alien quality; the use of the obsession as part defense, part expression of the aggressive impulse behind it; the notion of dynamic intra-psychic conflict, etc.

The patient is speaking: "I'm scared of catching diseases . . . The last time I was here . . . this girl said she had cancer . . . As soon as she mentioned that, I didn't want to sit at the table and eat. I didn't want her touching me . . . I know if she had cancer she wouldn't be on that ward. If I could only tell my mind that—it keeps going around . . . I mean, I knock it off for a while. I'll say to myself, try to convince myself that if she had cancer, she wouldn't be in this ward. So I'd be all right for a few seconds. Then it would come back to me again and I'd say, 'Ooh! Maybe she has!' and I'd say 'No,' and try to convince myself again, and that's all I would be doing all day long till I couldn't stick it out any longer. I couldn't stay in the hospital near her."

At this point, in addition to demonstrating the phobia of cancer, one can indicate to the students how frightened the patient was that something harmful (getting cancer) would happen to him, but that as yet there is no evidence of his being actively aggressive. One then returns to the material.

Pt. "(When) I went home, I took this shirt off and this pair of pants . . . and I didn't wear it for about three or four weeks

because that girl touched me, and I sat in the chair that she sat in. So I had my pants steam-cleaned and my shirt steam-cleaned. I'm wearing it right now, but I would rather have throwed it away. It's a fight to wear it, believe me, Doctor. I had them on a chair for about three or four weeks. My mother wanted to take them to the cleaners and I'd say, 'No, let them stay there.' I didn't want my mother to touch them."

Dr. "Why?"

Pt. "Because I was scared she might get cancer."

Dr. "Are you worried about other people the way you're worried about yourself?"

Pt. "Yes. I'm worried about other people very much. I make sure my hands are washed very thoroughly before I handle the food on the table because if dirt from my hands should fall on the milk or something, it upsets me."

Dr. "How?"

Pt. "Well, I have to convince myself. I have to keep fighting with myself. I have to say, 'No, your hands—you washed your hands, George. There is nothing on your hands,' and I have to keep doing that most of the day—telling myself that I washed my hands and nothing would go in the milk to harm anybody."

Here one demonstrates the patient's obsessions and compulsions, in particular their ego-alien quality, and the way the compulsion serves as a defense against the anxiety aroused by the obsessive thought. Moreover, one points out how the *passive* voice of his fear that harm would come to him has suddenly changed to the *active* voice of a fear that he might himself do harm to others. As he talks new facets of his personality structure appear.

Again, from the material:

Dr. "Part of your trouble is being afraid that other people will get hurt too?"

Pt. "Yes, it is, Doctor . . . I hate to walk by an elevator. If somebody is there, I'm afraid they might fall down. Not that I would push them. I wouldn't harm nobody. Gosh, I have enough troubles without harming anybody . . . If I'm going on a streetcar and there is a crowd, I'm afraid somebody might fall underneath the streetcar. (Once) I thought I accidentally pushed somebody under the streetcar wheels. It took me two or three weeks to convince myself that I didn't do it. I was even going to call up the streetcar company and find out if any accidents happened there . . . I wouldn't ever hurt anybody."

Dr. "How do you actually think you have hurt somebody?"

Pt. "I don't know. It just comes to my mind. It just comes to my mind, 'Did you harm anybody, George? Did you push anybody?' and I say 'No, I didn't push anybody. I had my hands in my pockets to make sure I didn't push anybody.' "

Dr. "But you're scared you're going to hurt somebody?"

Pt. "*Accidentally* I might . . . You accidentally might bump into somebody and push them underneath the car wheels, but that's an accident. I mean not that I want to do it. I mean, but gosh, you can't take somebody and throw them under the streetcar unless you really took him. And he's not going to stand there to let you throw him under a streetcar. He's going to put up a fight, and I'm sure with so many people being around me, I'm sure they're not going to stop me . . . I never harmed nobody in my life, Doctor."

Here one indicates to the students what a strange "accidental push" this is when one considers the patient's language and imagery—his fantasies of throwing someone under the wheels, fighting and struggling, keeping his hands in his pockets to prevent himself from pushing, spontaneously protesting that he doesn't want to push anyone. The strength and quality of the aggressive impulse that lies behind the symptoms and the role of this in producing symptoms have become clear. It takes little further exposition to point out to the students the nature of a dynamic intrapsychic conflict—in this instance, the patient's unconscious aggressive impulsive coming into conflict with his ego, and resulting in the formation

of the clinical symptoms of anxiety, phobias, obsessions, and compulsions, which in part permit expression in fantasy of the impulse and in part act as defenses against it.

This fragment from a recorded interview is necessarily brief. It is given here to indicate how the step-by-step presentation of illustrative case material in a systematic course of lectures, along with the theoretical concepts arising from the observations, can be used to provide simultaneously to an entire class of students an integrated knowledge of the principles of dynamic psychiatry that cannot be obtained in the more unstructured setting of small discussion groups. The lecture, therefore, has a unique function and is an indispensable complement to other teaching methods.

REFERENCE

1. SCHREBER, D. P. Memoirs of My Nervous Illness (translated and edited by Ida Macalpine and Richard A. Hunter). London: W. Dawson, 1955.

MEDICAL EDUCATION FORUM

Editorial

TOO MANY REPORTS—TOO LITTLE ACTION

"Let's get the show on the road" best describes our attitude toward the increasing number of reports on the problems of medical education. We have had the Magnusen report, the Reed report, the Bayne-Jones report, the study of twenty medical schools, and now the Bane report from the Consultants to the Surgeon General. The time for implementing the reports was yesterday, but we will settle for today. We believe that we can diagnose the ills of medical education, but considerable funds are required in the right places and under the right circumstances in order to treat the patient.

The recent Annual Meeting on the Association of American Medical Colleges was, in a sense, dominated by the report of the Surgeon General's Consultant Group on Medical Education. This report makes new proposals and reconsiders previous proposals for strengthening medical education.

Some readers may feel that the report lacks a punch or that it must have been written collaboratively with the Bureau of the Budget. We agree with these opinions; but the main need today is not just a vigorous report. We need vigorous action, and we need it *now*.

The necessity for more doctors is recognized by everyone. New schools are required, and existing schools must be expanded as adequate financial support, facilities, faculty and students become available. We should never sacrifice quality for quantity by converting academic processions to production lines. This is a danger that we must avoid.

The proposals for enlarging the dwindling pool of qualified applicants for medical school make good sense. A solid national scholarship and loan program would be a timely development. Graduate students in other fields can find financial support from a variety of sources. Indeed, financial support is practically thrust upon them. Since World War II, the number of graduates with the degree of Doctor of Philosophy has risen far more rapidly than those with Doctor of Medicine degrees. As a result, our universities will award about 10,000 Ph.D.'s this year as against 7,400 M.D.'s. The fall in quality is demonstrated by the dwindling percentage of freshman medical students with an "A" average—40 per cent in 1950 to 18 per cent in 1958. The proposals for increases in loan and scholarship funds from private, state, and federal sources are a major contribution of the report.

The federal aid programs for construction are proposed on a matching basis. We suspect that the local wells are beginning to run dry on matching funds for construction. The Health Facilities Council might investigate this problem before larger amounts of federal matching money are appropriated.

We hope that the major accomplishment of the Bane report will be *action*. Let's be sure that medical education directs the action! Let's assemble the cast and get the show on the road!

JOHN Z. BOWERS, M.D.
Editor-in-Chief

Datagrams*

VETERANS ADMINISTRATION–MEDICAL-SCHOOL RELATIONSHIPS

The A.A.M.C. Committee on Veterans Administration–Medical-School Relationships recently requested the deans of the United States medical schools to fill out a questionnaire on the extent of current use of and projected needs for Veterans Administration hospitals by medical schools in their educational and research programs. Each of the 82 four-year medical schools replied. It was found that 71 medical schools participate by means of the dean's committee in the operation of 96 VA hospitals.

To what extent are the VA hospitals used for undergraduate education? The data from the questionnaire on this point are summarized in the table below.

TABLE 1

LENGTH OF TIME AND NUMBER OF MEDICAL STUDENTS RECEIVING INSTRUCTION IN VA HOSPITALS

	2nd Year			3rd Year			4th Year		
Discipline	No. of Schools Participating	Average No. of Students Per School	Average No. of Days In Hospital Per Student	No. of Schools	Average No. of Students	Average No. of Days In Hospital	No. of Schools	Average No. of Students	Average No. of Days In Hospital
Medicine	4	31	24.5	40	54	43.2	27	44	32.6
Surgery	1	16	4.0	31	60	38.8	30	41	30.7
Psychiatry	1	50	4.0	16	62	21.4	12	42	21.0
Physical Diagnosis	39	52	15.0	3	48	32.7	2	66	22.0
Other	1	90	1.0	9	65	9.1	12	50	12.9

In the area of graduate medical education, it was found that 67 VA hospitals participate in residency training programs, which include a total of 1,381 positions: 467 of these positions connected with 44 medical schools are in the area of medicine; 561 positions connected with 52 schools are in surgery; 150 positions connected with 27 schools are in psychiatry; and 203 positions connected with 32 schools are in other clinical areas.

* Submitted by the Division of Operational Studies of the A.A.M.C., 2530 Ridge Ave., Evanston, Illinois. Source of information will be furnished on request.

One of the problems which impedes the utilization of certain VA hospitals for medical education is geographical distance from the medical school. The usable data on this point indicate that 33 hospitals, or 38.4 per cent of the VA hospitals, are adjacent to the medical school using their facilities; 27 hospitals, or 31.4 per cent of the VA hospitals, are within fifteen minutes by car from the medical school; and 26 hospitals, or 30.2 per cent of the total, are more than fifteen minutes' travel by car from their respective medical schools.

Finally, the Committee was interested in learning the value of the VA hospitals to the medical schools. First, the deans of the medical schools were asked to rate the value of the VA hospitals they worked with to the medical school's various programs. The results are indicated in the table below.

TABLE 2

VALUE OF VA HOSPITAL TO MEDICAL SCHOOLS' TEACHING PROGRAMS

	Undergraduate Medical Education		Research		Residency Training		Other	
Rating of Value of VA Hospital to Medical School Program	No. of Hospitals Involved	%	No. of Hospitals Involved	%	No. of Hospitals Involved	%	No. of Hospitals Involved	%
1. Essential	24	26.7	9	11.3	20	24.1	2	22.2
2. Desirable	38	42.2	48	60.0	45	55.4	4	44.4
3. Not Essential	28	31.1	23	28.7	17	20.5	3	33.4
	90	100.0	80	100.0	83	100.0	9	100.0

A second way in which the deans estimated the value of the VA hospitals to the medical-school programs was in terms of replacement cost. The data indicated that 351 additional staff members would be needed in the medical-school faculties, $1,997,500 additional funds would be needed in medical-school budgets, and facilities for 15,850 outpatient visits per year and 4,395 beds for inpatients would be needed if VA hospitals were not available for use in the various programs of medical education.

It would appear from these data that it is the judgment of the deans of American medical schools that the Veterans Administration hospitals comprise an important segment of the facilities which are currently used to carry on medical education in the United States.

Addresses

THE PHYSICIAN'S HERITAGE*

FRANK G. SLAUGHTER, M.D.

It is sometimes startling to think that the cultural and professional roots of the profession to which we belong go back at least 50,000 years to the very beginnings of human history. Man has existed as a thinking animal, a "tool-making animal" as Benjamin Franklin described him, for roughly that period. From the evidence of archeology, he has also been a scalpel-making animal for about that same number of years. Skulls of some of the first men show without question that the operation of trephining, probably to let out the evil spirits believed then to cause disease, was performed fairly often and, even more amazing, successfully. Certainly very early in the story of mankind some men, perhaps braver than their fellows, dared to interpose themselves between the gods and ordinary humans. Called "medicine men" or "shamans," these early practitioners of medicine were the first physicians. No other learned profession goes so far back into the very roots of history, so it behooves us to be proud of our heritage from the past and the obligation it places upon us for future leadership.

The past 50 years have been a veritable golden age of medicine. Many bacterial diseases are now almost completely controlled by drugs. Surgery is safer and more effective than ever before. We read almost daily of new advances in research against previously incurable conditions, and the evidence seems to indicate that in the not too distant future, man's greatest enemy, malignant disease, may also be conquered. Only one other period in the history of science seems to have been in any degree as fruitful as have been the past fifty years in medicine. This was the golden age of Greek medicine and science beginning about 500 B.C. and extending several hundred years into the Christian era.

The first pictorial record of man's history dates back about 20,000 years and consists of a number of drawings found upon the walls of caves in Spain. In a similar set of drawings found at Trois Frères in France and dating back 16,000 years ago, a medicine man is shown wearing a "stag mask." Even then, the man of medicine had begun to distinguish himself from his fellows and, so to speak, begin a custom of isolation from other human activities and problems which to a regrettable degree still characterizes the medical man of today.

We of medicine can be exceedingly proud that the first two men in history to bear a name were both physicians. One was the Egyptian Sekhetenanach who existed sometime before 3000 B.C. The other was an Egyptian physician named Imhotep who was also an architect and builder of the oldest structure built by human hands in existence today, the Step Pyramid in Egypt.

That relatively advanced medical knowledge of both medical and surgical procedures existed very early in what might be called the civilized history of man was proved by

* Condensed manuscript of an address delivered before the student bodies of the Colleges of Medicine and Nursing, the University of Florida, September 29, 1959.

finding in the region of the Tigris-Euphrates valley scalpels used during the Sumerian period about 4200 B.C. Medical and surgical procedures followed in Egypt about the same time were described in several papyri written considerably later but disclosing a surprising amount of therapeutic information.

It is interesting to note that in the earliest code of laws in existence, that of Hammurabi written about 1900 B.C., an ethical code for physicians was prescribed.

Some of the earliest sea voyages and commercial transactions were made in connection with the buying and selling of spices, rare woods and perfumes. These were not only used as beauty aids and for flavoring food, but were the constitutents of many popular prescriptions and also formed an important part of embalming procedures for preserving the body after death. One of the earliest long ocean voyages on record took place about 1500 B.C. when Queen Hatshepsut of Egypt sent a Phoenician ship to the land of Punt, some five thousand miles down the east coast of Africa, in search of these highly prized medicinal ingredients. Actually, the trade in spices was very important down through the so-called Dark Ages and into the Middle Ages.

When, somewhere around 1300 A.D., the Ottoman Turks placed what might be called an iron curtain between Europe and the spice lands of India and the islands to the east, daring mariners began to seek other routes by which to reach the spice lands and the tremendously valuable trade they afforded. This led to two directions of voyaging. The ships of Prince Henry the Navigator circumnavigated Africa and sailed east, while other daring mariners, such as Christopher Columbus, sought a western route to the Indies and its fabulous riches. Thus medicine and the need for medicine played an important part in the story of discovery for at least 3,000 years of man's history.

About 1300 B.C., a Pharaoh came into power in Egypt whose ideas of religion were rather startlingly different from those who had gone before him. Egyptian religious worship was controlled by the priests of Ammon. A depraved type of religion, it was dominated by an extremely corrupt priestly hierarchy. Ikhnaton, or Akhenaten, conceived a new religion with only one god, a deity whose love for mankind was epitomized by the warmth and radiance of the sun. For a short period, Ikhnaton made this form of monotheism the official state religion of Egypt. The priests of Ammon were still powerful, however. Eventually they overthrew Ikhnaton and brought about his death, re-establishing the worship of their corrupt god.

The beauty of the concept of monotheism initiated by Ikhnaton is considered by many theological historians to have influenced Moses, the great Jewish leader, while he was growing up in the courts of Pharaoh. Indirectly then, it had a great deal to do with the concepts of the Judeo-Christian faith and with the laws set down by Moses for the guidance of the Jewish people. Many of these laws are actually part of an elaborate sanitary code, the first real such code in the history of mankind. And from them came many of the principles found in medicine's own Oath of Hippocrates.

The golden age of Greek science and medicine began about 550 B.C. with the physician-philosopher Pythagoras who apparently was the first to seek the cause of disease in nature instead of divine displeasure. The great Hippocrates of 460–355 B.C. was the most famous and skilled physician of the period, and his writings are still something of a medical bible from which we can learn much. Other Greek physicians made considerable contributions to medical knowledge, particularly Marcus Terentius Varro who lived in Rome and wrote about 100 B.C.: "Perhaps in swampy places small animals live that cannot be discerned

with the eye, and they enter the body through the mouth and nostrils and cause grave disorders." Here in a very few words is a statement of the germ theory nearly 2,000 years before it was finally proved by the studies of Louis Pasteur. Easily the most dogmatic figure in medicine of the late Greek period was Galen, whose ideas, perhaps because he wrote as dogmatically as he spoke, dominated medicine for close to a thousand years during the Dark Ages.

It is one of the ironies of history that the Christian religion, from which sprang the idealism which characterizes the medical profession, in itself prevented practically all medical progress for the some thousand years of the so-called Dark Ages. During this period most of what the old Greeks had written was destroyed, and almost the only repository for their vast learning, as well as for the advance of medical knowledge, was among the Arabs who at one time almost conquered Europe.

The 16th century brought the beginning of a true renaissance in medicine with the publication of the first real text book of anatomy, the *De Humani Corporis Fabrica* of Vesalius. Famous medical names appear in rapid succession during this period, men like Paré, Cardan, Paracelsus, Harvey and many others. In the 18th century a great battle against microbes, although not yet identified as such, began and extended for a period of almost 200 years. This conflict was the fight against a terrible scourge which swept through Europe, childbed fever.

About 1773 Charles White of Manchester, England, described a technique of cleanliness in obstetrics that considerably lessened the incidence of puerperal fever. In 1842 Oliver Wendell Holmes described, on a theoretical basis derived from his study of actual case reports, a theory of transmission of puerperal fever in which the blame was placed upon the hands of doctors and midwives who went from infected cases to healthy ones. Holmes was roundly censured for his beliefs, as was Ignaz Philip Semmelweis in Vienna and Budapest when he made very much the same discovery and proved it clinically.

Semmelweis actually performed antiseptic surgery with considerable success some 20 years before Lister, but it remained for the work of Louis Pasteur and Lord Lister finally to show that puerperal fever as well as wound infection in surgery could be prevented by the use of antiseptics. Actually the 19th century might almost be called a preparatory period for the tremendous discoveries of the past 50 years.

Although the man of medicine has traditionally isolated himself somewhat from other fields of knowledge, as well as many human activities which are not directly related to his profession, there never has really been a time when medicine could be divorced from other spheres of education. Oliver Wendell Holmes once wrote: "Medicine learned from a monk how to use antimony; from a Jesuit how to cure the ague; from a friar how to cut for the stone; from a soldier how to treat gout; from a sailor how to keep off scurvy; from a postmaster how to sound the Eustachian tubes; from a dairymaid how to prevent smallpox; and from an old market woman how to catch the itch insect. It borrowed acupuncture from the Japanese heathen, and was taught the use of lobelia by the American savage." We might add that in very recent years medicine also learned from Indian fakirs how to treat insanity by means of the swamproot which they have used since ancient times.

More pertinently, a famous scientist said not long ago, "Deuterium (heavy hydrogen) in the ocean's waters is sufficient to provide many times the present rate of world energy consumption for more than a billion years." When we think that a single pound of heavy water gives the same energy as half a million pounds of coal, yet costs only $28, we begin

to get some insight into the vast changes which the discovery of some method for harnessing the tremendous energy of the hydrogen atom will bring to the world. It can truly be said that mankind stands almost on the threshold of a millennium in which there need not be poverty, lack of food, or the necessities of life for any person upon the globe.

Already the tremendous advances in preventing and treating disease, particularly with the antibiotic drugs and the efficiency of modern surgery aided by various scientific advances in that field, have changed the face of medical practice. In addition we are dealing with an older population in which the economic problems concerned with the provision of medical care will almost certainly increase considerably as the years go by. Yet we must solve them, if the government is not to solve them for us through socialized medicine.

The conclusion is inescapable that the physician can no longer occupy an isolated place in the world and limit himself entirely to the day-to-day practice of his profession. Whether we wish it or like it, we as a profession are certainly going to have to play a much more integral role, not only in the care of diseased mankind but also in the fields of public health, geriatrics, and medical sociology and economics. It behooves us therefore, as we move from fifty years of what might be called the golden age of medicine into an era whose problems are inevitably going to be considerably different from those we have faced in the past, to remember the obligation of our long heritage and to assume the positions of leadership with are both our right and our duty. In paying tribute, therefore, to our ancient heritage, we also cannot escape facing the obligations which that heritage places upon us. Even as Stone Age men looked to their shaman or medicine man for guidance, so the world today will expect guidance and leadership from the medical profession. This is the obligation we must assume in the future, and certainly it is as important and as demanding as the heritage we accept from the past when we receive the diploma of a doctor of medicine.

THE HERNDON MEDICAL CENTER

JOHN PARKS, M.D.*

Decisions on the type and location of a medical career do not come easily to many medical students. Thus, it is particularly interesting that a group of medical students at George Washington University School of Medicine determined, during their medical school days, to establish a group practice in nearby Herndon, Virginia. The medical faculty encouraged this venture from the beginning and a faculty-student physician project was born. Recently, the success of the project was emphasized by the opening of a new clinic building by the Herndon Medical Center at which Dean John Parks brought the following message from the medical school.—J. Z. B.

It is a pleasure to be present and to participate in these ceremonies associated with the opening of this new medical center here in Herndon. Quite naturally our faculty and The George Washington University School of Medicine have a paternal professional interest in our former students who have organized this center for the purpose of providing modern medical care for the people of this community.

First I should like to pay tribute to the families of these medical alumni of George Washington University and their associates. They have not only given support to the educational costs of their sons, but they have helped them maintain and develop a practice ideal which has resulted in the establishment of this fine new medical center which we dedicate today in Herndon.

It is unusual that these young men in the third year of their medical studies should initiate through their friendship and foresight long-range plans to prepare themselves to serve this community and to provide Herndon with a pattern of medical practice in which there will be a proper sharing of responsibility between family physicians and specialists with adequate support of nearby suburban and metropolitan hospital facilities.

Unlike the usual group practice association made up of physicians of different age and variable training, these six doctors have the advantage of starting early to prepare a place for themselves in their professional lives. First they have found that as students of medicine they worked well together. Next, each has taken or is in the process of taking advanced intern and residency training in preparation for a proper place in the group practice. Throughout their student and graduate preparation period not only have they learned the details of medical and surgical care, but they have investigated such features of practice as equipment, record procedures, and business details which can best be applied to your needs.

Our faculty has participated with real interest in the growth of this group association. In their clinical training years many students develop associations which they hope to carry over into their practice years. However, circumstances after graduation tend to separate congenial classmates. Following internship-residency appointments and economic opportunities are usually based upon competitive random chance, and seldom is it possible to carry into practice the close associations of medical school days. This group of George Washington University graduates have maintained an unusual singleness of purpose. Theirs is a project in which parents, alumni, and faculty have all been pleased to cooperate. We see in

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the Herndon Medical Center an example of how medical education and early planning with our students can be of more practical value to them and to the communities which they prepare themselves to serve.

Group practice is a necessary trend of our time. It promises to be the most effective means of providing good health for the American people living in rural areas and on the periphery of cities. There are still a number of areas of our country where the old-time family physician knows everyone in the community and considers the majority of the people as his friends as well as patients. These qualities of friendship and understanding must be maintained by all doctors of medicine, but the environment in which future physicians will have to work is one of rapid change. For example it is reliably estimated that 20 per cent of the population change residence annually. A new address for one-fifth of his patients each year creates a problem for the physician just as it does for everyone else who provides professional or living services to the people of a community. In addition to providing emergency and curative medicine to an ever moving and growing population, physicians are prepared to prevent more diseases than ever before in the history of the world. Prevention will always provide more long-term health than is possible with curative measures in medicine. Thus, doctors have double duties in prevention and cure which were not known to the practice of medicine only a few years ago.

Transportation, group practices, improved equipment, and better hospital facilities have made the physician's services one-third more efficient than they were prior to the last world war. However I am sure that you as recipients of medical care and those of us who are responsible for the teaching of medicine are not only interested in efficiency, but we are also concerned with the preservation of the practice of medicine as a human art and science containing all the good qualities of the old-time practitioner. Sympathy, kindness, understanding, and self confidence are qualities of the well trained mind of an adequate physician. The system under which he practices does not necessarily influence these features of his professional characteristics. They can be evident in group as well as individual practice.

The members who form the professional nucleus of this Center have stimulated in their teachers a new sense of responsibility in medical education. Not only will we give careful future consideration and encouragement to groups of students who wish to prepare themselves for a unit type of practice, but we shall do our best to see that our graduates receive hospital and clinic training suited to the area of their anticipated professional activity. We shall maintain an academic as well as a personal interest in the Herndon Medical Center. We feel that these six physicians have already demonstrated professional maturity of a high order. While they will be new to the area and several members are still in the process of preparing themselves for special services here, these physicians have combined their abilities to bring through the Herndon Medical Center a safe, satisfactory community-appreciated type of suburban medicine, a form of practice which will fill the needs of our growing, moving America.

Communication

A NOTE ON CONFERENCES FOR FOREIGN SCHOLARS IN MEDICAL SCIENCES

HAROLD H. LOUCKS, M.D.*

In the spring of 1946 the writer was traveling in the interior of China with the late Dr. Alan Gregg, Director of the Division of Medical Sciences of The Rockefeller Foundation, and Dr. C. Sidney Burwell, then Dean of the Harvard School of Medicine. In one of the cities of that area, while visiting the local university, we encountered a president in more than usual distress. This individual, a brilliant research chemist, had achieved his doctorate with great distinction at a well-known American institution for higher learning. Then suddenly, not long after returning from the United States, he found himself designated president of his home school. He was, however, as unversed in the administrative needs of his university as he was learned in the principles of biological chemistry. His distress was made manifest by the warmth of his welcome to our small group, and the entire period of our visit was occupied by our attempts to answer the multitude of questions with which he was overwhelmed.

This experience, which was not new to Dr. Gregg, became a subject of much thought and discussion as our travels continued. All of us returned home with the conviction that some opportunity should be provided for students from abroad to acquire at least a minimum knowledge of the general principles underlying the organization of a medical school, the selection of teachers and students, the formulation of a curriculum, the organization of a budget, the function of committees, and the many other concepts and principles which stem from as well as put structure into a philosophy of education. Even a minimum of exposure to discussions of this nature could provide background for the man who suddenly finds himself responsible for the conduct of a department, a school, or even, as in the instance mentioned above, a university.

In subsequent years the China Medical Board of New York gave a good deal of thought to the organization of such a program. The possibility of organizing, during a semester or a vacation period, a series of seminars dealing with the fundamental problems of medical education and administration was discussed with a number of deans in the more populous foreign student centers. It was not until the autumn of 1956, however, that the idea began to assume definite form. At that time Dr. M. H. Trytten, Chairman of the Committee on International Exchange of Persons of the Conference Board of Associated Research Councils in Washington, whose organization had for several years been accumulating successful experience in the conduct of conferences for foreign scholars in the field of general education, proposed that the China Medical Board underwrite a similar gathering for medical teachers. The Association of American Medical Colleges, through Dr. Ward

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Darley, Director, was brought into the discussions, and from June 24 to 27, 1957, the first conference on medical education for foreign scholars in the medical sciences was held on the campus of the University of Wisconsin under the joint sponsorship of the AAMA and the Conference Board of Associated Research Councils. The papers read at this meeting were published in a special issue of the *Journal of Medical Education* (Part 2, March, 1958).

The response of the participants in this conference was so favorable that a second conference was held June 29–July 2, 1958, again at the University of Wisconsin. Papers from this conference also appeared in the *Journal of Medical Education* (March, 1959). A third conference was held at the State University of Iowa June 21–25, 1959.

Approximately fifty foreign scholars,[1] most of whom had completed a year or more of study in the United States and were about to return to their home schools, participated in each of these three conferences. In addition, some fifteen to twenty leaders in American medical education, many of whom had served abroad and were familiar with conditions in other parts of the world, were also in attendance. Much time was allowed for spontaneous small group conferences and discussions as individual participants discovered others with common problems, or sought to test their ideas against those of the resource personnel.

The environment at the State University of Iowa, as at the University of Wisconsin, proved to be most pleasant. Dean Nelson, Dr. W. W. Morris, and their associates left nothing undone to see that a relaxed, informal, friendly atmosphere was established, well designed to promote the maximum sharing of ideas.

There would seem to be no doubt that this annual bringing together of foreign medical scholars has proved its worth.

[1] The foreign scholars attending the conference were nominated by the Conference Board of Associated Research Councils, the International Cooperation Administration, the Pan American Sanitary Bureau, the Kellogg Foundation, The Rockefeller Foundation, and the China Medical Board of New York.

ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

ANGELA SANCHEZ-BARBUDO, PH.D.
Abstract Editor

L' Institut de Cardiologie de Montréal. PAUL DAVID, M.D. Montréal Médical, Vol. X, No. 11, pp. 10–17 (March), 1959.

Montreal's Institute of Cardiology was created in 1954 by the *Soeurs Grises* (Grey Sisters) Order of Montréal, who added an entire new floor to their Maisonneuve Hospital to house it. Dr. David, Director of the Institute (also a member of Montreal's Medical Faculty) explains in this article the organization, aims, achievements, and future expectations of this institution on its fifth anniversary. Its main purposes are the following: (1) The grouping, in one locale and under one medical direction, of a team of physicians exclusively dedicated to the solution of the multiple problems raised by modern cardiology; (2) the provision of all the equipment necessary for the diagnosis and treatment of heart patients; (3) to make available, with all possible speed, to all residents of the province who suffer from heart diseases, all the benefits of the progress achieved elsewhere; (4) active participation in this progress by encouraging research in well equipped laboratories; (5) to foster Government recognition of the numerical, social, and economic importance of heart diseases in order to organize a dynamic and efficient fight against them; (6) the teaching of cardiology to students, interns, and doctors; and (7) the development of a social service to aid the physical and psychological rehabilitation of the cardiac patient. As to the achievements of the Institute, the author points out that, starting almost from nothing, it now includes 56 beds, several consultation rooms, radiodiagnostic, hemodynamic and electrocardiographic services; operation room, post-operative care; research laboratories, and, last but not least, the wholehearted cooperation of all the other services of the Maisonneuve Hospital. Its staff consists of ten cardiologists (seven of them full-time); two full-time surgeons and one consultant; ten residents and interns; and three physicians dedicated entirely to research. In 5 years, 5,028 patients have been hospitalized for a total of 82,226 days (about half of these were women, which observation, it is pointed out, may indicate that in the area served by the Institute heart diseases seem to afflict men and women with the same frequency); 29 per cent of the hospitalized patients received free care under the Public Assistance Law (doctors did not receive any remuneration). During the same period, 7,501 patients referred by their family doctors were examined in the Institute whose cardiologists are on the way to becoming, essentially, medical consultants (this, the author points out, might be the only policy likely to satisfy the general practitioner who must not see rivals in the Institute's staff but only collaborators). In five years, 649 cardiovascular operations have been performed. The Institute's laboratory and research equipment, described in detail, features, besides a Blood Bank, the first *Banque d'Artéres* (Artery Bank) in Canada making arterial grafts available, free of charges, to all surgeons of the country. A good deal of the Institute's resources is dedicated to teaching, and a vast educational program has been organized for students (the Insti-

tute is in charge of the cardiovascular instruction for all University of Montreal medical students), interns, and residents, as well as for practicing doctors (since 1954, it organizes every year a "Practitioner's Week," attended, among others, by groups of internists anxious to keep their cardiological knowledge up to date). The Institute's medical staff also benefits from regular weekly gatherings where all kinds of problem cases are presented and discussed. As to future developments, it is pointed out that significant progress can only be expected if and when new and larger buildings are made available to the Institute. (Even as it is, its admission list has become so long that a selection of patients must be made.) It is hoped, however, that an enlarged Institute will be able to work in much closer association with all other hospitals and, above all, with the University of Montreal's Faculty of Medicine. Dr. David believes that "total collaboration" between hospitals or research organizations and the medical schools has become indispensible in the Province of Montreal, where academic medicine is represented by one single Faculty. This Faculty, the author believes, must become in the near future "the Brain" of a medical program which would coordinate the efforts of all hospital and research centers in order to fill the needs and solve the specific medical problems of that Province.

Medical Education in the United States —1910–1956. SAUL JARCHO, M.D. Journal of the Mount Sinai Hospital, Vol. XXVI, pp. 339–85 (July–August), 1959.

In this report, principal emphasis has been given to the instruction of the undergraduate medical student (including his premedical education). The author also explains that, since medical education—like all other components of medicine—"functions in a complex social environment and reflects or refracts the influences thence derived," this survey will point out both the influences and their reflection whenever such can be discerned (without implying, however, any commitment to a doctrine of economic determinism). Starting out with a discussion of the *Flexner Report*, its economic and social background, and the social climate prevailing during the following decade, the author reviews the reforms which developed in that period concerning the number of medical schools and students; prerequisites for admission; curricula; full-time staff; research; and the financing of medical education. The next section of the study is devoted to the two decades between 1921 and 1941, and the repercussions of economic boom, catastrophic collapse, and war preparations on the universities and medical training. Despite the vicissitudes of the American economy, the medical schools continued their work of instruction, research, and improvement throughout that period (among the special problems medical education had to cope with, special attention is drawn to the plight of the Negro in American medicine, and the racial and religious discrimination practiced in the admission to medical schools; the extent and complexity of these problems, it is pointed out, are not fully exposed by the available statistics). The last phase in the development of medical education considered in this survey includes the eventful years from 1942 to 1956. The influence of World War II on medical schools and training is discussed at length (the constant changes in the military situation and in government policy produced constant turmoil among medical educators and students, as illustrated by the occurrences of 1944). Also examined is the numerical situation of medical schools and students during the post-war period; the systems of admission (opportunities for Negroes to enter medical schools increased considerably after the War, and discriminative barriers have been lowered in general); curricula reforms, and the studies and investigation of fundamental educational principles which led to them; special problems of graduate and postgraduate training; the financial situation of medical schools and research, etc. As to future developments to be expected in medical education (briefly dis-

cussed at the end of this report), the author predicts that the number of medical schools and students will continue to increase slowly, while the number of college graduates will increase sharply (the latter does not automatically imply a corresponding increase in the number of applicants to medical schools because the competition from industry will be strengthened). Great improvement in the quality of applicants should not be expected, since high schools will be overcrowded in the next years, and no adequate measures have as yet been taken to improve secondary school education. However, the curricula of medical schools and their equipment will continue to improve, in spite of an expected serious shortage of competent instructors and medical research workers. The fate of the internship is considered precarious, but "its total extinction is improbable." Residency programs (under even stricter supervision) will improve, especially if suitable arrangements can be made for the use of private patients for teaching. Postgraduate education will improve greatly. As to the economic future, the present inflation and threat of depression are seen to imply a fundamental instability in the finances of medical schools. If government aid should be withdrawn—which is not considered likely to happen—the entire educational structure would crumble. A preview of the future medical graduate depicts him as well-grounded in clinical medicine, psychiatry, and public health ("if he is lucky, he will be an educated man in addition"). An ample list of biographical references can be found at the end of Dr. Jarcho's study.

Las Reformas Fundamentales Pendientes de Realizar en la Enseñanza de la Fisiologia (A Project of Fundamental Reforms in the Teaching of Physiology). Dr. JOSÉ JOAQUÍN IZQUIERDO. Gaceta Médica de México, T. LXXXIX, No. 3, pp. 205–20 (March), 1959.

Attempts to reform the teaching of physiology in Mexico go back a quarter of a century: the first was made in 1934, sponsored by the author (cf. J. J. Izquierdo, *Balance Cuatrocentenario de la Fisiologia en México*, Mexico, 1934). The fate of these reform projects, never entirely carried out, and the efforts made in their behalf, or against, since 1934, are discussed at length in this paper. The main guiding principles of the reforms advocated by Dr. Izquierdo and other medical educators are as follows: (1) Physiology must be taught with a vision going beyond the immediate limited interest for man; its problems must be presented and discussed following ample and unified criteria emphazising its quality of a dynamic-functional biological science. (2) Laboratory work should not be aimed merely at the verification of acquired knowledge but should constitute true essays of investigation and research, in order to show the future doctor which are the roads he must follow to obtain new knowledge, and to help him acquire the scientific criterion indispensable in the exercise of his profession. These principles, the author points out, do not seem to be included in the general objectives currently assigned to medical education in Mexico, which demand that the student "acquire knowledge, skill and an ethical conscience" and require him "to study, retain and apply" the basic principles and fundamental mechanisms of medical science. The teaching of the finer, more specific knowledge is reserved for the graduate student (cf., *Declaración de México sobre Educación Médica*, Prensa Médica Mexicana, Vol. 23, No. 6, pp. 235–39, 1958). Furthermore, when the program of a reformed instruction in physiology was first presented, it was opposed on the ground that it would be way above the mental capacity of the average student, and that it was designed to produce physiologists rather than physicians. However, Dr. Izquierdo contends, the students themselves, when offered parts of this new program (it has as yet never been adopted entirely), not only revealed that it did not surpass their capacities but showed the most eager interest in carrying out their new tasks.

The Teaching of Trauma in Medical Schools. CHARLES G. JOHNSTON, M.D. The American Journal of Surgery, Vol. 98, No. 4, pp. 566–68 (Oct.), 1959.

There has long been concern about the scope and quality of trauma instruction in medical schools, and the American Association for the Surgery of Trauma has been interested in this matter for many years. Before World War II, some attempts were made to determine the level of trauma instruction in medical schools, the conclusions being that trauma was not included as a subject in the medical curriculum and that little attention was given to it in general. As to later developments, neither the first-aid courses established during the war nor the MEND program more recently introduced in many medical colleges is dealing specifically with trauma problems, although, it is suggested, MEND could and should be integrated with the teaching of trauma. In 1955, Dr. Harrison McLaughlin, at the request of the American Association for the Surgery of Trauma, carried out another inquiry, among professors of surgery, about the status of education in trauma in American medical colleges. The information he obtained provides the basis for the present paper (although the inquiry did not include all schools, the 47 institutions supplying information may be considered as a fair cross-section). More than half of those answering the questionnaire indicated that instruction on trauma ought to be improved. It was stated, however, that basic considerations of trauma were included in all surgical courses. As to clinical contact and experience with the active care of trauma, the inquiry revealed that this phase of teaching was limited in most schools and completely ignored in many. The implication that the teaching of trauma was not at a high level elicited various comments, for the greater part in agreement with that opinion (only a few defended, not too strongly, the adequacy of their program). There were indications, however, that improvements could and would be made. As a rule, large urban universities had more experience in acute trauma for students than those located in smaller communities, but even in schools situated in big cities, there were instances of little concern in this matter. On the other hand, in institutions where large city hospitals are the principal teaching hospitals for a medical school (as is the case at the University of Louisville, the University of Cincinnati, the University of Tennessee, etc.), experience in problems of trauma is by matter of necessity an important part of the surgical training program, whereas in hospitals in which cases of patients injured in accidents are infrequent, utilization of all instances of trauma for teaching purposes requires a special effort. A splendid example of such an organization for the teaching of students, interns, and residents is described (cf. Cole and Schneewind, The Teaching of Trauma at a University Hospital, *Bull. Am. Coll. Surgeons*, 40:204, 1955). It is pointed out, however, that even where such well organized facilities are not feasible, a creditable educational program in the teaching of trauma can be created by the careful utilization of such accident material as available to any University Hospital (as an example, the University of Iowa Medical School is cited, where material from all the specialty services and from general surgery is used to provide a coordinated program of presentation of the acutely injured patient, as well as the sequelae; in addition, surgical clinics devoted to traumatology are held once a week, and senior students are assigned to the emergency room). It can be concluded from the 1955 inquiry that while basic aspects of the problems of trauma are presented by surgical departments in almost all U.S. medical schools, because they are subjects fundamental to surgery, the application of these surgical principles to trauma gets short shrift in medical education. At the same time, the need for good education in trauma is becoming increasingly serious, trauma being considered as the nation's most urgent health problem in relation to the active, most useful period of the lives of its people. Although attacks on the problem from the

preventive angle are not neglected, doctors are of paramount importance in controlling death and crippling. Trauma, it is emphasized, cannot be divided into public safety and medical aspects: these are one and the same problem. A better preparation of doctors to help solve it constitutes a pressing challenge to which medical educators must rise promptly.

Trends in General Practice. G. E. GODBER, M.D. The Lancet, Vol. II, No. 7096, pp. 224–29 (Aug. 29), 1959.

The National Health Service in Britain, whereas it can and does provide opportunities for the practice of better medicine, does not determine, however, what the nature of that "better" practice should be. Contrary to the claim of some "ill-informed critics" that the N.H.S. is regimenting medicine and interfering in the doctor's methods of practice, it is, according to Dr. Godber (Deputy Chief Medical Officer, Ministry of Health) a fact well established during the Service's first 10 years of existence that this organism need not and does not interfere with clinical methods in general or hospital practice. Reviewing the improvements in general practice which have taken place in Britain in the last decades, the author discusses some of the recent revolutionary changes in medicine, such as, above all, the antibiotics which have made it possible for the general practitioner to save lives on a scale he could not have envisaged 20 years ago, but which also have imposed on him the heavy demand to constantly keep abreast of all new methods of treatment. Diagnostic techniques have also advanced rapidly, and everywhere in Britain general practitioners have now access to pathological and radiological facilities (in 1957, 5 per cent of all the work of hospital laboratories and 9 per cent of all radiological work was done on direct reference from general practitioners). On the other hand, specialization in hospital practice has increased sharply and become general (including even the smaller hospital centers), especially since 1948, when the N.H.S. made it possible to finance specialist practice wherever it was needed. As a consequence, a good many well trained specialists who were before partly in general practice have turned wholly to specialist work, while a great number of newly trained specialists have also entered the field (since 1948, an increase in consultants of over 45 per cent has taken place). However, about one general practitioner out of four still holds a salaried position in the hospital service, although only a small one. It has often been said that specialization has gone too far and will be reversed, but the author thinks it very unlikely that there ever will be a return to the staffing of general hospitals by general practitioner-specialists. The latter's influence, however, may reassert itself in hospital practice in a different way, owing to another important change in hospital methods: Between 1949 and 1957, the number of admissions to hospitals increased by 30 per cent without any comparable increase in beds, mainly by a progressive reduction in the length of stay. This has not been merely the result of an attempt to deal with long waiting lists, but also of a progressive change in clinical method. It is now considered sound rehabilitation to promote the early return of a patient to home surroundings, which recognition has led to a conscious effort to treat inpatient care as an incident to be avoided or shortened as much as possible, while outpatient services are used increasingly for investigation and treatment. Several other recent changes in hospital methods which affect general practice in various ways are discussed in support of the author's main point: the questionability of the contention that hospitals have been set apart from the practice of medicine in the community, and that increasing specialization is making association more difficult. The main problem for the next decade in both hospital and general practice is, according to Dr. Godber, to overcome the lack of proper exchange of information on patients between the two sides. Also emphasized, as a matter for improvement, is the fact that there is a social

medical element in general practice which has as yet all too little representation in hospital work. The part played by psychological factors in physical disease has only recently begun to be appreciated or, at least, to be discussed. The time has come, the author thinks, to talk about it a great deal more, and for the general practitioner to make his contribution to the treatment of his patient in the hospital, just as the specialist should cooperate in the practitioner's management of the patient after his stay in the hospital. In the future, the practitioner should also play a larger part in Preventive Medicine, not only in active immunization programs but also in the fight against disease through early diagnosis and in the social management of mental illness, where reforms now in progress will lead to very different methods. As to his role in research, although general practice does not lend itself to abstruse scientific studies, it does provide unique opportunities for the study of morbidity and the natural history of disease. The greatest difficulty for the general practitioner of the future, as envisaged by Dr. Godber, will be to keep himself informed. The science of medicine cannot fail to progress, but, he affirms, "humanity in medicine is an even greater thing, and good family practice is our chief guarantee of its survival."

NEW BOOKS

KENNETH E. PENROD
Book Review Editor

Abstracts

Atlas of Roentgenographic Positions. By VINITA MERRILL. 2d ed. St. Louis: C. V. Mosby Co., 1959. In two volumes. 663 pp. $32.50.

This edition follows by 10 years the first edition which had as its purpose to provide a practical reference book for x-ray technicians. This was done by including a description of many roentgenographic positions and procedures, presenting information pertaining to anatomy and physiology, presenting a definition of the more usual terms used in roentgenography, and providing a bibliography to facilitate further detailed study. Since the first edition many advances have occurred in the field. Some 40 new positions, together with many new illustrations, have been added to this edition, and a number of the older ones have been replaced. In an effort to use more uniform and more informative terminology for the purpose, fairly extensive changes have been made in the titles employed to designate various positions. The author has stressed the need for elimination from the language of the profession of some misnomers such as "plate" and "picture." He advocates the substitution of the terms "radiograph" and "roentgenogram." To a major extent this Atlas deals with the tested and accepted techniques and attempts to avoid those topics which are undergoing constant change. In this way the permanency of the volumes is insured. To facilitate easier handling the second edition is in two volumes of approximately 300 pages each.

Principles of Human Pathology. By EDWARD B. SMITH, PARKER R. BEAMER, FRANK VELLIOS, and DALE M. SCHULZ. New York: Oxford University Press, 1959. 1088 pp. $15.00.

This new text in the field is a result of the collaborative efforts of four active instructors in a single department and is dedicated to a correlation of the facts of the basic sciences with the clinical features of disease. The contents are so arranged that, initially, the student should develop an over-all appreciation of the wide scope of pathology with its broad categories of disease. The presentation of details is postponed until the student has the principles well in hand. Secondly, the student should understand the dynamic forces in disease tissues, including the chemical reactions to injury, movements of fluids and cells, the development of immunity, the ways of eliminating noxious substances, and the mechanisms for alteration and repair. Thirdly, the student should recognize that pathologic processes occur in the bodies and minds of his patients with varied and important relationships to sociologic, biologic, and geographic environments. In certain areas the discussions exceed the scope of the usual textbook of pathology. These broader explanations deal with the effect of bacterial endotoxins and exotoxins, the enzymatic factors in inflammation, chemical processes in metabolic diseases and vitamin deficiency states, the noxious effects of chemicals and of therapeutic agents, medicolegal responsibilities of the physician, the medicolegal autopsy, and abnormalities of pregnancy and the placenta. To provide a more useful and effective textbook for the beginning student of pathology the authors have paid particular attention to sequence, emphasis, basic relationships to previous subjects and relative simplicity.

A Textbook of General Physiology. By HUGH DAVSON. 2d ed. Boston: Little, Brown & Co., 1959. 820 pp. $14.50.

Three new chapters have been added to this edition that were not found in the first edition of this book. These are entitled "The Sensory Response," "Excitability of Cardiac Muscle," and "Electric Activity in the Smooth Muscle." In addition, the chapter on the cerebrospinal

fluid has been expanded to include a corresponding treatment of the aqueous humor. Minor increases in scope, such as a brief account of the mechanisms of metabolic energy transformations, have also helped to increase the size of this edition. The author proposes a new definition of general physiology: "The study of those features of life that appear to be common to all forms."

The Foot and Ankle—Their Injuries, Diseases, Deformities and Disabilities. By PHILIP LEWIN. 4th ed. Philadelphia: Lea & Febiger, 1959. 600 pp. 339 illustrations. $14.00.

In this edition a considerable amount of up-to-date material has been added and many new illustrations added or substituted. Some deletions have been made. The book contains the presently accepted concepts of etiology, diagnosis, and treatment. Several subjects have been given additional emphasis, especially compound fractures and crushing wounds. This book will serve as a guide to medical officers of the armed forces in routine military life and to the industrial physician. The sections on traumatic gangrene and amputations have been amplified in consideration of the advent of conservatism for medical management of conditions which formerly called for amputations. In discussing treatment the author has attempted to tell the reader three things: (*a*) what to do, (*b*) when to do it, and (*c*) what not to do. One of the outstanding additions to this edition is the inclusion of the work of Grice and of Irwin on Arthrodesis of the Subtalar Joint. The appendix has been completely rewritten.

A Manual for Histologic Technicians. By ANN PREERE. Boston: Little, Brown & Co., 1959. 209 pp.

This manual is not a reference book, but is intended primarily for the trainee. It offers practical material simply presented in order to prepare the beginner for work in a routine pathology laboratory. The material is based on an outline of requirements issued by the Registry of Medical Technologists, Muncie, Indiana. A condensation of the basic essentials of histologic micro-technique and a compilation of standard accepted methods is presented with only enough theory and background to promote greater understanding and to produce satisfactory results. More detail is given to what may be encountered daily in a histologic laboratory than to specialized procedures. In addition there is included a brief chapter on histology, a glossary of words that are likely to be new to the trainee, and a list of suffixes and prefixes. Also included is a "How To" chapter that deals with the hidden difficulties encountered and makes suggestions for avoiding or remedying them. The book should prove of value to students of histologic technique, histologic workers, teaching technicians, and residents in pathology.

Synopsis of Gynecology. By ROBERT JAMES CROSSEN, DANIEL WINSTON BEACHAM, and WOODARD DAVIS BEACHAM. 5th ed. St. Louis: The C. V. Mosby Co., 1959. 332 pp. $6.50.

In this edition of the now familiar Synopsis series, the two Doctors Beacham have joined with Dr. Crossen. As a consequence, the revision is considerable, and a fresh point of view is introduced. Two new chapters have been added—one on endometriosis and the other on pregnancy complications. Included in the latter are new discussions of abortion and of hydatidiform mole and choriocarcinoma. Twelve chapters have been completely rewritten, and the others have been revised and brought up to date. Malformations and vestigial structures have been grouped together in one chapter, and the chapter on diseases of the vagina now includes cystocele, rectocele, and caracele and fistulas. The chapter on benign lesions of the uterus includes lesions of the cervix as well as those of the corpus. In the chapter on disturbances of function, etiologic factors in amenorrhea and the management of abnormal uterine bleeding are discussed in detail. In the discussion of ectopic pregnancy, a correlation of the pathologic changes with the clinical manifestations helps to clarify the understanding of this variable condition. As before, this Synopsis is intended primarily for those students who will not become gynecologists.

Preschool Vision—Tests, Diagnosis and Guidance. By R. J. APELL and R. W. LOWRY, JR. Published by The American Optometric Association, Inc., 4030 Chouteau Avenue, St. Louis, Mo. 189 pp. $7.50.

The publication of this book was initiated by the A.O.A. Committee on Visual Problems

in Children and Youth because it was the feeling of the members of this group that Preschool Vision covers an area of ophthalmic literature and child care which, prior to this time, has not been adequately covered by any other published works. The material covered by this book is of interest to ophthalmologists, eye, ear, nose, and throat specialists, educators, psychologists, and all others who have a mutual interest and responsibility for the care of the child in preschool and early school ages. For the most part the material of this book comes from observation of normal visual development and methods for testing the visual development of preschool children at the Gesell Institute of Child Development in New Haven. The children used in this study were from average to high-average income families in the New Haven area. They are the children of the same type and cultural background as have been studied in several books by Gesell and his co-workers.

Human Nutrition and Dietetics. By SIR STANLEY DAVIDSON, A. P. MEIKLEJOHN, and R. PASSMORE. Baltimore: The Williams & Wilkins Co., 1959. 816 pp. $15.00.

The intention of the authors has been to set out the whole wide subject of human nutrition in proper perspective and to bring its many aspects together into one volume. In the words of the authors it is directed to "anyone interested in applying modern scientific knowledge to the practical problems of human nutrition, both in health and disease." This will, of course, encompass a wide variety of people. The book is written primarily in the language and style familiar to medicine but should be intelligible to nonmedical people professionally concerned with the subject. The book is divided into six parts: (*a*) an account of the physiology of nutrition, (*b*) a general description of the foods most commonly eaten by man, (*c*) a detailed description of those diseases that are known to be primarily due to faulty nutrition, (*d*) the role of defective diets in contributing to the onset of general diseases which are not primarily nutritional in origin, (*e*) nutrition in relation to public health, and (*f*) modifications necessary to normal diets to meet the specific circumstances of pregnancy, lactation, childhood, athletic training, and climatic extremes. Numerous tables showing the nutritive values of different foods will be found in Parts 1 and 2, while twenty diets recommended for the treatment of various diseases, and a table of suitable dietary exchanges, have been inserted at appropriate points in the text of Parts 3 and 4.

Jewish Medical Ethics. By IMMANUAL JAKOBOVITS. New York: Philosophical Library, 1959. 381 pp. $6.00.

This treatise, in a somewhat larger format, was originally presented to the University of London as a thesis for the doctorate of philosophy in 1955. The author, now a rabbi in New York, was formerly Chief Rabbi of Ireland. The subjects treated include eugenics, sterilization, abortion, euthanasia, anatomical dissection, and the attitude toward faith healing and irrational medical beliefs. Several pertinent chapters are devoted to the physician in Jewish religious law—his studies and privileges, his license and legal responsibilities, his professional charges, and the admission of his evidence. Many references to the original sources in religion, medical, legal, and historical literature are included. The fundamental theme of the book is that today the contest between science and religion is no longer a competitive search for truth; it is a struggle between excesses and controls, between the supremacy of man's creations and the supremacy of man himself.

The Physician and the Law. By ROWLAND H. LONG. 2d ed. New York: Appleton-Century-Crofts, Inc., 1959. 292 pp. $5.95.

In this edition cases of importance decided since the issue of the first edition of this book have been presented; the text has been revised and brought up to date. The purpose of this book has been twofold: to afford the practicing physician some knowledge of the rules of law which govern conduct in the physician-patient relationship; to help the physician who has to appear in court as a witness in a case in which it is necessary to prove facts relating to injury, disease, and the causal relation between injury or disease and death. The book is designed for the use of the physicians, but lawyers may also find it helpful. Much of what is presented here may seem to some elementary, but if that is so, it is asserted that there is need for the elementary. It is hoped that this book, though critical of some practices, will have a constructive worth to the medical and legal professions.

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NEWS FROM THE MEDICAL SCHOOLS

Bowman Gray

A group of full-time faculty members of the Bowman Gray School of Medicine have pledged $100,000 toward the current $500,000 state-wide campaign for the school's research center fund. The purpose of the campaign is to aid the school in constructing a $750,000 building to house a major share of its research activities. The building is to be a part of the medical center formed by the North Carolina Baptist Hospital and the Bowman Gray School of Medicine.

U. of Chicago

JAMES W. MOULDER will become chairman of the department of microbiology July 1. He will succeed WILLIAM D. TALIAFERRO, who retires at that time as Eliakim Hastings Moore Distinguished Service Professor as well as chairman of the department of microbiology.

A member of the faculty since 1944, Moulder has been a professor of microbiology since 1957. He is also joint editor of the *Journal of Infectious Diseases* published by the University of Chicago Press.

Columbia

A recent gift of $5 million by an alumnus of the university will go toward the construction of an 18-story medical research building at 168th Street and Fort Washington Avenue, on the grounds of the school's College of Physicians and Surgeons. According to President GRAYSON KIRK, this is the largest gift ever made to the university by a living individual and will enable Columbia to broaden the scope of its exploration in important areas of medical research.

The generous donor is William Black, president and founder of the Chock Full O'Nuts Corporation. He is also president and founder of the Parkinson's Disease Foundation, with national headquarters at 125 E. 50th Street, New York City. The Foundation is the first and only organization of its kind devoted exclusively to scientific research into the cause, prevention, and cure of Parkinson's disease. One of the floors of the new building will be devoted to research projects of the Parkinson's Disease Foundation.

To be known as "The Jean and William Black Medical Research Building," it is expected that the structure will be the largest voluntary medical research building in the United States.

Hahnemann

The tri-state area's only cancer hospital —the American Oncologic Hospital of Philadelphia—strengthened its forces in the fight against cancer by entering into a scientific affiliation with Hahnemann Medical College and Hospital. The 56-bed Oncologic Hospital will expand its cancer research program and Hahnemann Hospital will be able to intensify its cancer patient care program. Dr. PAUL GROTZINGER, associate professor of surgery at Hahnemann, has been named medical director at Oncologic Hospital. Dr. LUTHER BRADY, associate professor of radiology, has been appointed chief radiation therapist. Oncologic Hospital medical staff members will be invited to join the Hahnemann faculty.

Harvard

Two of the nation's outstanding collections of medical and scientific literature—

those of the Boston Medical Library and of Harvard University—will be brought together within the new Francis A. Countway Library of Medicine to be built in the next few years at the Harvard Medical School, according to current plans. The Countway Library has been made possible through a gift of $3.5 million to the university by Miss Sanda Countway of Brookline. Harold A. Vanderbilt has subsequently donated $1.4 million for the library and the John and Mary R. Markle Foundation has contributed $200,000 for the endowment. The Medical School is seeking to raise an additional $3 million for endowment to insure the operation of the Countway Library and all of its service. To this collaborative operation the Boston Medical Library will also commit its financial resources. Under terms of the agreement, each library will retain its identity and will continue to own and control its own property and investments. Both libraries have outgrown their present quarters, and have found they are being called upon to perform services that are increasingly similar; thus the merger will bring the resources of the two libraries together under a single roof.

Iowa

Preliminary budgets for constructing and equipping two buildings at the State University of Iowa's Psychopathic Hospital were approved recently by the State Board of Regents. Funds for the two structures, a research addition to the present building and a separate but connected unit for emotionally disturbed children, will come from state appropriations augmented by Public Health Service grants. According to Dr. PAUL E. HUSTON, professor and head of psychiatry at SUI and director of the Psychopathic Hospital, the new research addition is needed to provide facilities for the university's studies into the cause, prevention and treatment of mental disorder, and to improve the training of research personnel interested in the field of mental health.

Johns Hopkins

Formal ceremonies for the opening of a laboratory for leprosy research were held January 13, at the Johns Hopkins University School of Hygiene and Public Health. The laboratory, which succeeds one that has been maintained by the Leonard Wood Memorial for the past 13 years at the Harvard Medical School, is being financed by the Memorial, aided by a grant from the National Institute of Allergy and Infectious Diseases of the Public Health Service. Dr. JOHN H. HANKS, bacteriologist of the Memorial for the past 20 years and now associate professor of pathobiology at the School of Hygiene, will be the director of the laboratory. He will be assisted by Dr. CLAUDE V. REICH and Dr. BYRON S. TEPPER, both of whom were associated with the University of Illinois, and Dr. NORMAN E. MORRISON, who was on the faculty of the University of Otago in New Zealand. All of the staff members will have faculty positions at the university and will share in the teaching at the School of Hygiene.

Major activities of the Memorial include large-scale drug evaluation studies in Japan, the Philippines and the Union of South Africa, long-term field studies of leprosy in the Philippines, support of the pharmacological and pathological research on leprosy and financial support of the *International Journal of Leprosy*. In the Philippines, funds provided by the Memorial were used to construct a laboratory at Culion and, at Cebu, a skin dispensary and the Childs Leprosarium, which now houses 1,100 patients.

Kansas

A secretariat for the International Commission on Comparative Neuro-Anatomy of the World Federation of Neurology will be established at the University of Kansas. Dr. HOWARD A. MATZKE, professor of anatomy, will be the director. KU will be one of two such centers—the other will be at Giessen, Germany. One of the purposes of the com-

mittee in establishing the two secretariats is to permit centralizing, cataloguing and organizing material available at research centers throughout the world. When finished, a complete catalogue will be located at each secretariat with material available to researchers from all over the world. The Commission will also establish contacts throughout the world so that new material can be collected at a minimum of expense of time and money. Another important function will be to obtain and give financial assistance to further work in comparative neuro-anatomy. Such assistance will be in the form of grants to promote study of material already collected, fellowships to individuals to allow them to study at universities with large collections of material, financial assistance for expeditions to collect material, and assistance for experiments on animals in the animals' locale.

Michigan

A newly opened $1.5 million addition to the University of Michigan School of Public Health has doubled the teaching and research facilities of the unit. The addition includes laboratories for research in epidemiology, industrial health, radiological health and sanitation. There are multipurpose lecture and workshop rooms, specially-constructed radiation labs with lead-lined walls, library facilities, and a two-story open laboratory for testing large equipment. Additional space has been provided for each of the school's five departments: environmental health; epidemiology, industrial health; public health practice; and public health statistics.

New York University

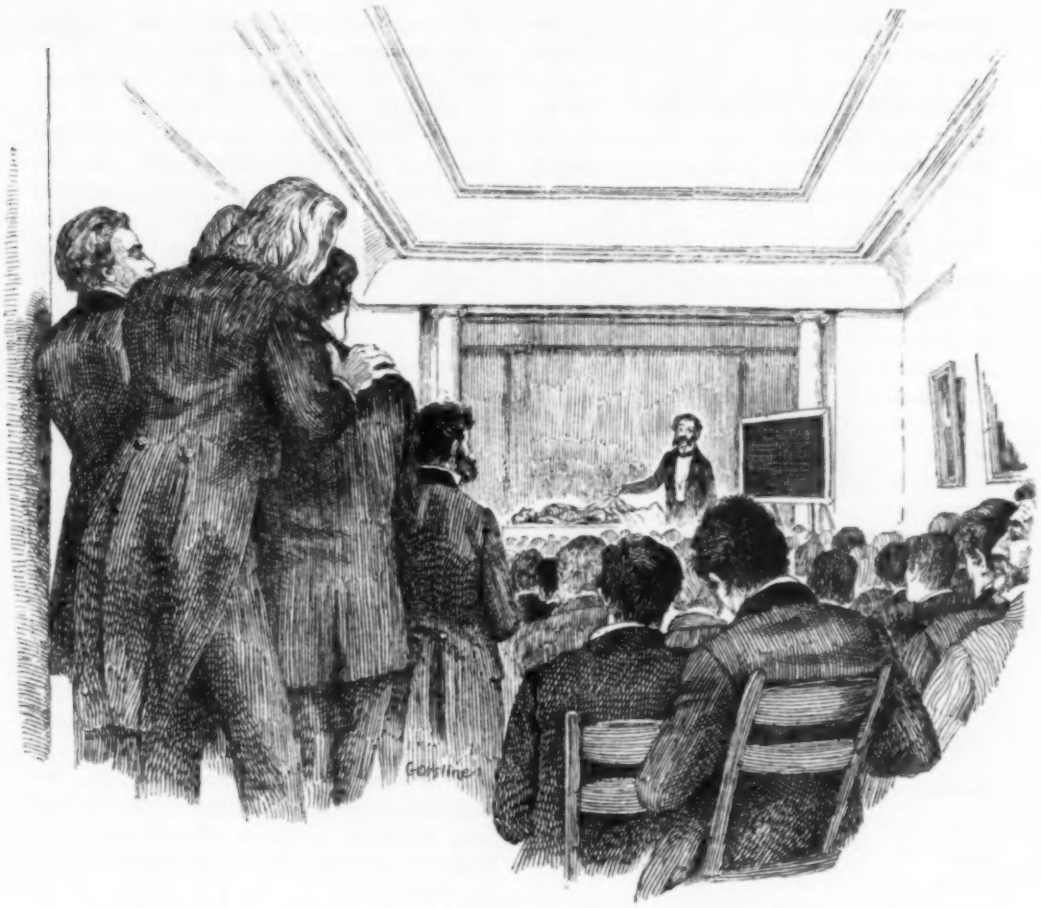
Dr. BARBARA FISH has been appointed associate professor of clinical psychiatry at the College of Medicine and psychiatrist-in-charge of the Children's Service of Bellevue Hospital Center. Prior to this appointment, Dr. Fish was assistant professor of clinical pediatrics, instructor in psychiatry at Cornell University Medical College, and child psychiatrist in the department of pediatrics at New York Hospital.

Pennsylvania

A new era in heart disease research has begun at the University of Pennsylvania with a $1.1 million, ten-year grant from the Public Health Service for investigation into the comparative diseases of the heart and blood vessels of animals and man. Dr. DAVID K. DETWEILER, associate professor of veterinary pharmacology, and chief of the laboratory of physiology and pharmacology at the School of Veterinary Medicine, will serve as director and principal investigator of the University of Pennsylvania Comparative Cardiovascular Studies Unit. The Unit will also carry out an international training program for research in comparative cardiology of the World Health Organization. According to university officials, it is expected that research scientists from all over the world will come to the university for the specialized training. The School of Medicine, including the Robinette Foundation for Cardiovascular Research, and the Graduate School of Medicine will join the School of Veterinary Medicine in carrying out the research. Also cooperating will be the University's Graduate School of Arts and Sciences, and the Penrose Research Laboratory of the Zoological Society of Philadelphia.

Pittsburgh

The teaching program of the School of Medicine will be strengthened during the coming year as a result of a $400,000 gift from the A. W. Mellon Education and Charitable Trust. The funds will be used over an 8-year period to expand the teaching program of the school's department of preventive medicine. Dr. KENNETH ROGERS, associate professor of maternal and child health at the Pitt Graduate School of Public Health, will become professor and chairman of the department of preventive medicine. Dean FRANCIS A. CHEEVER stated that in establishing a first-class teaching



Medical Lectures

You can form no idea how crowded the medical lectures are here. I have discontinued attending the public ones (there are at least 2500 students here) because it was necessary to go full half an hour before the time of commencing in order to get a seat within earshot of the lecturer. In the same way, there are about 200 students going round every morning with each of the best physicians at the hospitals. So that you are tolerably lucky if you get in a third row round the bed of a patient; the light by which you see the patient being moreover only that of a candle, because it is so early in the morning. 'Tis very miserable to get up in the morning before it is light, and turn out immediately into a thick fog, thro' which one has to pass to the hospital, more than a mile.

—Sir George Paget, writing of his student days in 1833 (*Memoirs and Letters of Sir James Paget*). Edited by Stephen Paget, London, 1902, p. 96.

and research program in the important area of preventive medicine, the School of Medicine has received generous support from the Graduate School of Public Health. He believes that the development of this department will be the forerunner of many productive collaborative efforts by the two schools in the future.

The School of Medicine has received a $78,768 grant from the National Institutes of Health to help construct and equip a laboratory for rheumatologic and orthopedic research. The funds will be used to purchase additional equipment and to complete interior construction of the existing wing between the School of the Health Professions building and Presbyterian Hospital. Research in the laboratory will be under the joint supervision of Dr. ALBERT B. FERGUSON, Jr., professor of orthopedic surgery, and Dr. GERALD B. RODNAN, assistant professor of medicine. The joint laboratory will include facilities for pathology, chemistry, physiology, seriology, x-rays and radioisotopes, an operating room for experimental surgery, animal quarters, and office space.

Rochester

As part of its Greater University Program of expansion, the University of Rochester Medical Center will build a four-story diagnostic and treatment center for the chronically ill, at a cost of $1,317,220. Construction will begin in mid-March, with completion expected by the spring of 1961. About one-half of the space available will be devoted to rehabilitation facilities, including areas for physical therapy, occupational therapy, an evaluation clinic, and speech and hearing sections. Activities will be designed to train the handicapped to care for themselves in daily living. The remaining half will be used for complete diagnostic facilities for ambulatory patients, and also will include a prosthetic clinic. Dr. ROBERT L. BERG, professor of preventive medicine and community health, will direct the center.

Dr. W. J. MERLE SCOTT, a member of the faculty of the School of Medicine and Dentistry and of the senior surgical staff of its Strong Memorial Hospital since opening of the hospital in 1926, will retire June 30, as professor and chairman of the department of surgery, and surgeon-in-chief of the Strong Memorial and Rochester Municipal Hospitals. Dr. Scott will attain emeritus status after a long career devoted to medical education and research. In 1954, under Dr. Scott's leadership, a new vascular research program was initiated in the laboratory of experimental surgery at the Medical Center, and in 1955, under his direction, closer affiliation between the Medical Center and other hospitals in the community was developed. After retirement from the chairmanship of the department, Dr. Scott will continue a selected practice of surgery with his office in the University Medical Center.

Seton Hall

Dr. HUGH G. GRADY has been named Acting Dean of the College of Medicine, filling the vacancy created by the death on December 4, 1959, of Dr. CHARLES L. BROWN. Dr. Grady has been associated with Seton Hall since 1957, when he was appointed professor and director of the department of pathology. Prior to this he had been Scientific Director of the American Registry of Pathology of the Armed Forces Institute.

Tulane

An experimental program of faculty visitations to colleges in a three state area, aimed at interesting undergraduate students in the biological sciences, has been inaugurated at Tulane University. Dr. HYMEN S. MAYERSON, professor and chairman of the department of physiology, and members of his department, were asked by the American Physiological Society to undertake this program which is supported by a two-year grant from the National Science Foundation to the Physiological Society. Members of other basic science departments will be included. Faculty members speak to classes and biology majors, conduct seminars for students and faculty, and are available for consultations with students.

Yale

A contribution of $110,000 to the Cardiac Fund of the Yale-New Haven Medical Center by the Victoria Foundation, Inc., will be used to construct a new surgical suite, including a cardiac operating room and an adjoining control room for necessary electronic equipment. According to medical center authorities, the new quarters will eventually become part of an entirely new 10-room operating pavilion to be built within the next year or so.

Dr. C. N. HUGH LONG, Sterling Professor of Physiology and chairman of the department of physiology, was honored recently when he received the 1959 Pharmaceutical Manufacturers Association Award for outstanding contributions in the field of medicine. Among Dr. Long's research is his work on the importance of various endocrine glands, particularly the adrenal, in diabetes; his investigations on carbohydrate metabolism, and his studies that have advanced the physiological theory of muscle activity.

ITEMS OF CURRENT INTEREST

China Medical Board Establishes Fellowships Honoring Alan Gregg

In recognition of the late Alan Gregg's outstanding leadership and significant contributions to medical education throughout the world, the China Medical Board of New York is establishing an Alan Gregg Travel Fellowship in Medical Education to be awarded annually to a member of the faculty of an American medical school. It will enable the faculty member to undertake study in the Far East that will increase his effectiveness as a medical educator. The fellowship will provide for study and travel expenses and also a stipend as decided by the Award Committee.

The applicant must be a citizen of the United States, at least 30 years of age and not more than 55 years of age when the proposed project is due to start. He must hold a full-time position on the faculty of a medical school and be recommended by the Dean of his school. Projects must be concerned with the areas of the Board's interest in the Far East, i.e., South Korea, Japan, Taiwan, Hong Kong, Philippines, South Vietnam, Thailand, Malaya, Indonesia, and Burma. Applications for the fellowship should be submitted before April 15, 1960, with the Director, China Medical Board of New York, 30 E. 60th St., New York 22, N.Y. Address all inquiries to the same address.

American Board of Nutrition to Hold Examinations

The American Board of Nutrition will hold the next examinations for certification as a Specialist in Human Nutrition during the week of April 11–15, in Chicago. Candidates who wish to be considered for these examinations should forward applications to the Secretary's office not later than March 1. Application forms may be obtained from Robert E. Shank, Dept. of Preventive Medicine, Washington University School of Medicine, Euclid and Kingshighway, St. Louis, Mo.

New Grants to Support Clinical Pharmacology

The Burroughs Wellcome Fund, a nonprofit organization with headquarters in Tuckahoe, N.Y., is announicng a program of grants to medical schools to maintain new faculty positions in clinical pharmacology. During the next five years, the Fund will award five grants to medical schools to underwrite the salary of a full-time teacher in clinical pharmacology. Each of these grants will be for a total amount of $75,000, payable over the five-year period. According to Burroughs Wellcome President, W. N. Creasy, the reason for setting up the grants is to alleviate the shortage of qualified physician investigators specializing in clinical pharmacology. This shortage is due to the small number of medical schools with training programs in this highly specialized work, so important in the investigation and evaluation of new drugs, he said. The program of grants, he added, should stimulate both research and training in clinical pharmacology.

Further information may be obtained by writing to The Burroughs Wellcome Fund, 1 Scarsdale Road, Tuckahoe, N.Y.

American College of Surgeons Names New Director

Dr. John Paul North, Dallas, Texas, will became the Director of the American College of Surgeons, effective January 31, 1961. He will succeed Dr. Paul R. Hawley, the College's Director since March, 1950.

Dr. North has been chief, Surgical Service, Veterans Hospital, Dallas, since 1955, and professor of clinical surgery at the Southwestern Medical School of the University of Texas since 1946. He was in the private practice of general surgery in Philadelphia, 1932–42, at which time he held an appointment at the University of Pennsylvania School of Medicine as instructor and associate in surgery.

MEND News

The Walter Reed Army Institute of Research conducted the second MEND symposium of the current academic year on December 15–17, 1959. Dealing with the topic, "Blood, Fluids, and Trauma," the symposium drew 132 faculty members of medical schools, the greatest number yet registered at a MEND-sponsored gathering.

The annual MEND Coordinators' Conference was held at the Palmer House on Saturday, February 6, immediately preceding the 56th Annual Congress on Medical Education and Licensure. Reports of regional MEND activities and special disaster projects carried out by various medical schools were presented.

HEW News

Dr. Paul A. di Sant'Agnese of Columbia University has been appointed to the staff of the National Institute of Arthritis and Metabolic Diseases, where he will direct and plan the clinical and laboratory research in cystic fibrosis, celiac diseases, and allied disorders. He took up his new duties January 1. Dr. di Sant'Agnese will also serve as a clinical professor of pediatrics at Georgetown University Medical School, and as Director of the William F. Green Cystic Fibrosis Clinic of Children's Hospital, Washington, D.C.

Dr. Arnold B. Kurlander has been named the Assistant Surgeon General of the Public Health Service. His specific area of re-

sponsibility will be to provide immediate staff assistance to the Surgeon General on current program matters, to facilitate communications between the four Bureaus of the Service and the Surgeon General's office, and to expedite the handling of program aspects of operating problems.

Dr. Robert B. Howard, dean of the University of Minnesota Medical School and professor of medicine there, and Dr. John Todd Cowles, professor of psychology at the University of Pittsburgh School of Medicine, have been appointed to serve a three-year term on the Selection Committee for the Senior Research Fellowship program for the National Institutes of Health, U.S Public Health Service. As members of the Committee, Dr. Howard and Dr. Cowles will advise and make recommendations to the Surgeon General on the selection of qualified persons for the five-year fellowships. The purpose of the fellowship program is to increase manpower for research in the preclinical sciences.

PERSONNEL EXCHANGE

Faculty Vacancies

PSYCHIATRIST: Board certified or Board eligible, to act as a consultant to state mental health clinics, plan education programs for clinic personnel, to assist communities in organizing mental health clinics, to teach medical students and psychiatric residents concerning the field of community mental health, and to organize and participate in research on problems in community mental health. Interest in child psychiatry desirable. Position carries a professorial appointment in the medical school. Rank and salary according to qualifications. Address: Paul E. Huston, M.D., Chairman, Department of Psychiatry, College of Medicine, State University of Iowa, Iowa City, Iowa.

PEDIATRICIAN: Full-time teaching and research. Interested candidates please send complete curriculum vitae and recent photograph to Dr. J. M. Severens, Creighton University School of Medicine, Omaha 2, Nebr.

ASSISTANT PROFESSOR OF ANATOMY: Ph.D. or M.D. State medical school, Southwest. Opening for histologist-embryologist with research interests. Ample time and facilities for investigative work. Salary dependent on past record. Address: V-81.

PSYCHIATRIC SOCIAL WORKER: Full time appointment as assistant professor of psychiatric social work in department of psychiatry. Duties will include some administrative responsibility, supervision and teaching in the undergraduate program of the medical school and in the residency training program. Salary, $7500 per annum. Interested applicants should send curriculum vitae and a recent photograph to Mrs. Imogene S. Young, Director, Psychiatric Social Work Services, University of Maryland Medical School, Baltimore 1, Maryland.

DIRECTOR OF INTERN EDUCATION: Physician director of Intern Education needed for 300-bed hospital. Salary $10,000 per annum, plus extra stipend for research fellowship. Write Dalton M. Welty, M.D., Washington County Hospital, Hagerstown, Md.

VIROLOGIST: Positions available for two individuals with B.S. or M.S. degrees with background in virology. Positions are in a research laboratory associated with a medical school. Address: V-82.

IMMUNOLOGIST-IMMUNOCHEMIST: Position as Research Associate is available for full-time investigations in the field of thyroid immunology and protein chemistry. Ph.D. or M.D. with training in protein manipulations and/or immunologic procedures. Salary $6,000 to $8,000, depending on background. Interested candidates should send a complete curriculum vitae and recent photograph to Dr. Sidney Shulman, Department of Bacteriology and Immunology, University of Buffalo School of Medicine, Buffalo 14, N.Y.

PSYCHIATRIST: Assistant or associate professor of psychiatry required. This position will be that of geographical consultant with a salary and rank according to experience and qualifications (within the range of $7,700 to $10,200) and private consulting privileges. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

CHILD PSYCHIATRIST: Assistant or associate professor in child psychiatry required. This position will be that of geographical consultant with a salary (within the range $7,700 to $10,200) according to experience and qualifications, and private consulting privileges. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

PSYCHIATRIST: Lecturer in psychiatry required. Salary (within range of $6,000 to $8,000) and consulting privileges, according to experience and qualifications. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

HEMATOLOGY: M.D. (young) to do research in modern diagnostic methods in hematology and allied diseases in collaboration with medical and engineering groups. Address: V-83.

MEDICAL DIRECTOR: Coordinator of medical education for a 300-bed major teaching hospital of a New England medical school. Academic appointment dependent upon qualifications. Consultation practice or research possible. Address: V-84.

PSYCHIATRIST: Board certified with university and state hospital experience to serve as supervisor of psychiatric residents for newly approved three-year program with time divided equally between University of Washington and Northern State Hospital. Position will carry faculty rank at the medical school and residence in Seattle is feasible. Present staff at Northern State Hospital is currently expanding from 25 full-time positions to an authorized strength of 35 positions for 1670 patients. Salary $14,220–$16,836. Address: Charles H. Jones, M.D., Box 309, Sedro Woolley, Washington.

MEDICAL DIRECTOR: Professional Services, large affiliated VA General Hospital. Certified specialist with more than casual experience residences and research, and flair for administration. Faculty appointment appropriate for qualifications. Active expanding research program. Ambitious, mature personality. Salary, $14,685-$16,000. Address: V-85.

OBSTETRICIAN-GYNECOLOGIST: Full-time teacher, administrator and investigator for department with active student and house staff program in well known medical school and affiliated hospitals in New York City. Must be interested in academic medicine. Rank and salary will depend upon qualifications. Age—preferably under 35. Address: V-86.

BACTERIOLOGIST: University Hospital at Saskatoon, Saskatchewan, Canada, now has a vacancy for an assistant bacteriologist. This appointment also carries a university teaching position. Salary $8,000–$10,000 per annum. Applicants should have hospital and teaching experience. Applications stating date of birth, qualifications, experience, present appointment, and the names of three references should be sent to the Director of Bacteriology, University Hospital, Saskatoon, Saskatchewan, by April 15, 1960.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

MICROBIOLOGIST-VIROLOGIST: Ph.D., presently on university faculty. Five years experience in virology and tissue culture publications. Desires academic position involving full-time research or research and teaching. Address: A-405.

ORTHOPAEDIC SURGEON: 38. Wants appointment in U.S.A or Canada. Main interest in Traumatic Surgery and Research. Now holding consultant post at well known British Hospital. Mastership in Surgery and Fellow of the Royal College of Surgeons. Address: A-406.

PSYCHIATRIST-NEUROPHYSIOLOGIST: M.D. Certified in psychiatry and as a mental hospital administrator. FAPA and FSPA. No formal training in neurophysiology but using some of its principles with gratifying results in coping with the manifold problems of psychosomatic medicine. Desires full-time career teaching position in medical school with opportunities for teaching psychiatry; for learning clinical neurophysiology well enough to instruct; and for carrying on more intensive course of clinical investigation. Address: A-407.

PHYSIOLOGIST: Ph.D., 1957, age 31, married, one child. Research in cardiovascular-renal physiology. Strong background in hypertension. Eleven publications. Experience in teaching medical, dental, and pharmacy students. Desires research position with or without teaching responsibilities. Address: A-408.

MICROBIOLOGIST: Ph.D., Sept., 1959. Training in all fields of basic microbiology with research in microbial metabolism. Desires faculty position with teaching and research opportunities in a university or medical school. Address: A-409.

PHYSIOLOGIST-ENDOCRINOLOGIST: Ph.D., age 36. Training and background in endocrine, cellular, mammalian and zoological physiology. Presently assistant professor engaged in teaching and research in endocrinology and general physiology. Formerly research associate in biochemistry. Desires academic and/or research position. Address: A-410.

ANATOMIST: Age 34, married. Ph.D. Anatomy 1957. Publications. Teaching experience in Eastern medical school. Desires teaching position with opportunity for research. Address: A-411.

INTERNIST: Age 35, married. Ten years training in internal medicine and hematology. Teaching experience and research in field of clinical hematology, B_{12} metabolism, radioactive uptakes, experimental hematology, and enzyme studies. Desires teaching position with opportunity for research. Address: A-412.

SURGEON: Age 35, native of Bombay, India. In U.S. since 1952. F.C.P.S. (Bombay), F.R.C.S.E. (Edinburgh). Completed residency training in general surgery in U.S. and successfully taken Part I examination of American Board of Surgery. Desires full-time position in teaching and/or research in American medical school. Presently senior resident in surgery in Eastern hospital. Experience in plastic surgery as well as urology and anesthesiology. Address: A-413.

UROLOGIST: University trained, finished 1956. Seeking full-time academic post: teaching, research, and clinical work. Presently in private practice and part-time university teaching. Address: A-414.

GROSS ANATOMIST: D.S.D., Ph.D. Ten years teaching experience in medical school; previously taught in dental school. Clinical experience in plastic and oral surgery. Research interests and publications: homotransplantation of tissues. Desires academic position in medical or dental school with research facilities. Will consider research associateship with plastic surgery department. Address: A-415.

MICROBIOLOGIST: Ph.D. Seeking position on medical school faculty in Southeast or Southwest. Many years experience and supervision in clinical microbiology. Six years on medical school faculty. Qualified in parasitology, virology and public health. Address: A-416.

SURGEON: Age 33. Certified in surgery and thoracic surgery. University trained with research background. Presently holding part-time university teaching appointment. Desires full-time academic appointment in surgery, preferably with additional duties as assistant dean working with curriculum and postgraduate training program. Address: A-418.

INTERNIST-GASTROENTEROLOGIST: Age 42. Board certified in internal medicine and in gastroenterology. Training and experience include 4 years as Mayo Foundation Fellow, full-time instructor in gastroenterology in leading university, clinical investigation and private practice. Trained in all gastroenterological techniques and bone marrow interpretation. Qualified in hematology, peripheral vascular diseases and rheumatology. Desires academic position in internal medicine, gastroenterology, comprehensive medical care section, as Assistant Dean, or as Director of Medical Education in teaching hospital. Address: A-419.

MICROBIOLOGIST-CLINICAL PATHOLOGIST: M.D., Ph.D., age 54, married. Wide experience in teaching and research in the United States. Returning after several years of teaching in medical schools in the Far and Middle East. Textbook in course of publication. Desires research or teaching position in medical school or in teaching hospital. Address: A-420.

PATHOLOGIST-VIROLOGIST: DVM, Ph.D. Experience in comparative pathology, virology and tissue culture techniques. Also considerable experience in teaching experimental pathology to medical students. Desires teaching appointment in a medical school that would provide opportunity for completion of courses leading to M.D. degree. Address: A-421.

PSYCHIATRIST: Board certified, with training in both general clinical psychiatry and public health psychiatry (M.P.H. degree). Six years' experience in administering a community-oriented psychiatric training program in an academic setting. Broad range of personal service in teaching, supervisory, and consultative capacities. Dynamic orientation. Numerous research publications. Age under 40. Currently assistant professor at medical school. Desires full-time faculty appointment at higher level. Address: A-422.

PSYCHIATRIST: Board certified in psychiatry and child psychiatry (pending). Eight years experience in teaching at student and resident level in adult and child psychiatry in academic setting. Broadly experienced in teaching, supervisory, and consultative capacities. Analytic orientation. Nine publications. Experience in administering child guidance clinic and in community aspects of psychiatry. Has held position as associate professor of psychiatry; wishes to head up division of child psychiatry in medical school in either true or geographic full-time position. Metropolitan area preferred. Age 45; married; 4 children. Address: A-423.

PHYSIOLOGIST-PHARMACOLOGIST: M.D., Ph.D., age 40. Teaching and research experience includes six years in pharmacology and six years in physiology, with one year training in laboratory of high polymer chemistry. Desires academic and research position in physiology or pharmacology department. Address: A-424.

INTERNIST: Board certified, university trained, with one year training in clinical cardiology and one year in cardiovascular laboratory. Presently holding position as university instructor. Desires faculty appointment with teaching and research in clinical cardiology and electrocardiography. Address: A-425.

ANATOMIST: Ten years teaching experience; all phases of medical school anatomy. Broad research interests with grant support in gross anatomy and histology. Desires university appointment. Northeast or northwest preferred. Address: A-426.

ZOOLOGIST: Ph.D., age 43, married, family. Desires teaching microanatomy in medical school. Experience: medical school teaching (medical parasitology); USPHS senior assistant scientist, foreign experience as malariologist; undergraduate teaching, including 6 years instructing pre-medical students in histology. Publications, active research program; current interest: histochemistry techniques in study of cellular basis of resistance to a parasitic infection. Willing also to instruct in parasitology, if situation permits. Available with one semester notice to present employer. Address: A-427.

ANATOMIST: M.B., Ch.B. (Witwatersrand, Johannesburg, South Africa), F.R.C.S. (Edinburgh). Age 52, desires position in medical school as senior lecturer in anatomy. Presently located at University of The Witwatersrand as official lecturer in anatomy; part-time senior lecturer in gross and applied anatomy since 1949. Publications. Surgeon to Union Defence Forces, 1940–46 with rank of major. In private practice as a general surgeon since 1946. Address: A-428.

PEDIATRICIAN: Age 40, married, 3 children, 7 years in general practice, 5 years in academic pediatrics as assistant professor. Emphasis on clinical teaching, growth and development research, and the handicapped child. Seeks relocation at associate professor level. Excellent references. Available in summer of 1960. Address: A-429.

PHARMACOLOGIST-CLINICAL: M.D., Ph.D., age 33, licensed physician. Publications, academic and industrial experience, some psychiatric training. Desires teaching position. Address: A-430.

HUMAN GENETICIST: Ph.D., age 36, seven years experience at leading human genetics center, including heredity clinic service, population surveys of hereditary traits, and statistical analyses. Fourteen publications. Desires permanent university position, preferably research and teaching. Address: A-431.

PHYSICAL BIOCHEMIST: Ph.D., Assistant Professor of Biochemistry in an Eastern medical school. Research and publications. Physical chemistry of proteins. Energetics, kinetics, and mechanism of enzymatic reactions. Protein interaction with ions and steroids. Isolation and identification of steroids. Osmometry and potentiometric studies of polyampholytes. Desires appointment with medical school or research institute. Address: A-432.

CERTIFIED INTERNIST: Age 38, experienced in diabetes, endocrinology, radioisotopes (licensed by AEC). Several years direction of medical residency training program, and radioisotope unit in large teaching hospital, and Assistant Professor of Medicine in charge of student diabetes clinics. Now in private practice. Desires return to full-time teaching hospital and/or medical school. Address: A-433.

GROSS ANATOMIST: Ph.D. Eight years teaching experience; desires academic position in medical or dental school. Available summer 1960. Address: A-434.

PHYSIOLOGIST-BIOCHEMIST: Ph.D. Faculty member medical school. Interdisciplinary major grant research program (3 technicians) in basic and clinical aspects of endocrine physiology, metabolism, biochemistry. Publications, societies, radioisotope experience, training in statistical design. References. Desires faculty career appointment teaching physiology and/or biochemistry with facilities and climate to develop research program. Address: A-435.

INDEX TO ADVERTISERS

Individual Membership

in the

Association of American Medical Colleges

In recent years the activities of the Association of American Medical Colleges have expanded far beyond the original considerations of administrative problems to the many and varied problems of medical education as encountered by the entire medical school faculty.

The expansion of activities has been due to the growing complexity of medical education —the swift development of the medical sciences, the rapid accumulation of new knowledge to be taught, the pressure for more graduates, the changing patterns of medical care, and countless other factors.

Because of these factors, the AAMC recognizes the need for a professional organization to represent not only the medical schools but the faculty members of these schools. Through the offering of individual membership, the AAMC provides you with the opportunity to exchange ideas, opinions and information through the Annual Meeting, Teaching Institutes, and other activities of the Association.

The AAMC also encourages you to attend the Annual Meeting, not only to meet with others who are teaching in your field and discussing the educational problems that are peculiar to it, but also with the idea of becoming familiar with the entire field of medical education as one of society's most important enterprises. The time has come when teachers of medicine must meet together and discuss the problems and activities that are peculiar to medicine as education just as they are accustomed to meet and talk about medicine as science.

As an Individual Member you are entitled to receive *The Journal of Medical Education*, the only publication devoted exclusively to medical education. The Journal also carries the latest news from the medical schools and provides a valuable service through its Personnel Exchange column. You receive the yearly *Directory*, the Proceedings of the Annual Meetings, and *The Medical Mentor*, a newsletter which will keep you informed on items of current interest in the field of medical education, both nationally and internationally.

Individual Membership, at only $10 a year, is open to any person who has demonstrated a serious interest in medical education over a period of years. All the privileges of membership and a provisional membership card are granted immediately after payment of the $10 fee, although confirmation must await official action at the next Annual Meeting.

To obtain membership, fill out the application form below, append check for $10, and return to the Association's central office at 2530 Ridge Ave., Evanston, Ill.

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1. Clein, N. W.: Pediat. Clin. North America, Nov., 1954, pp. 949-962.